HENRY H. ROGERS

# TRUE BEARING

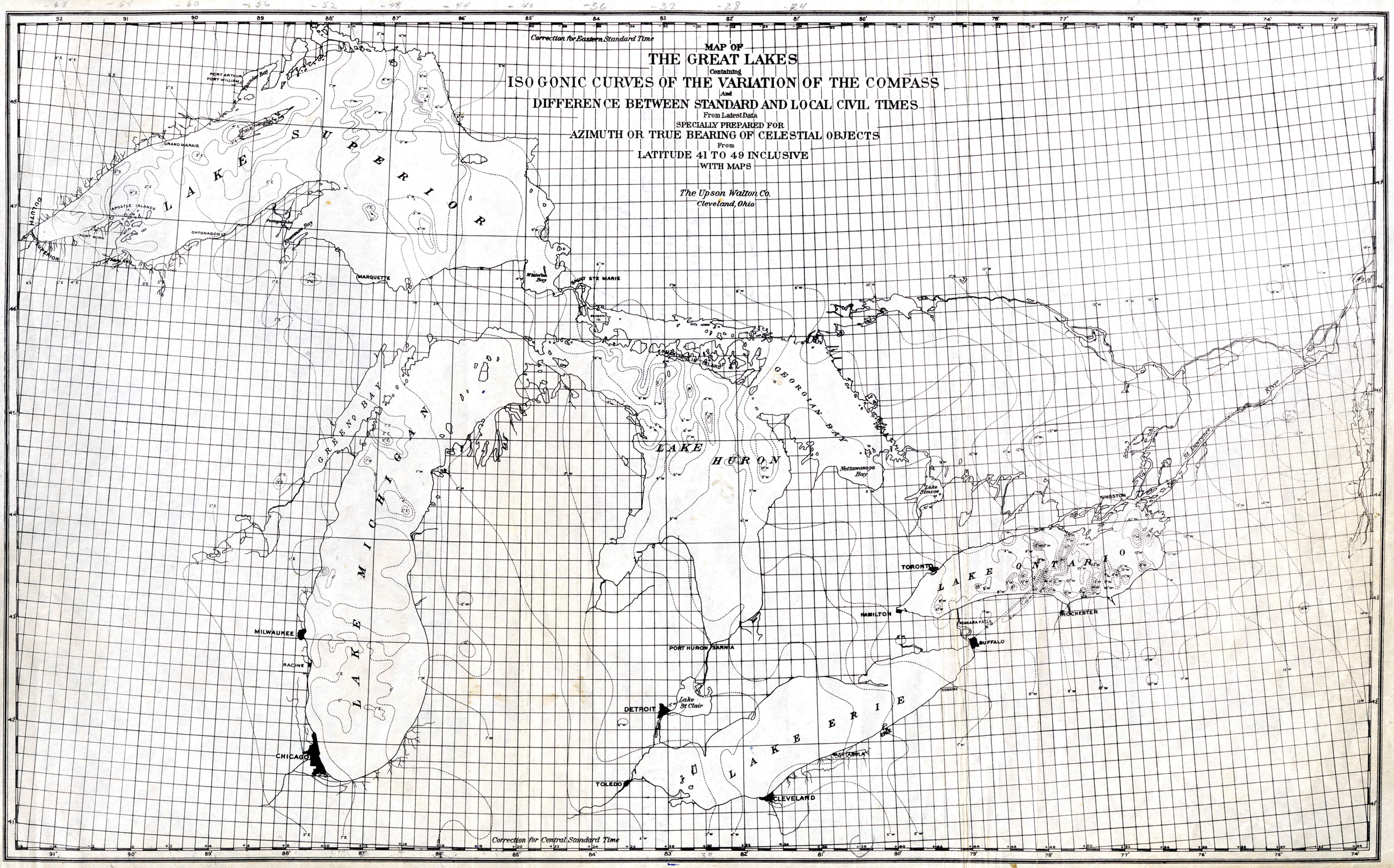
OF

# CELESTIAL OBJECTS FOR THE GREAT LAKES

BY

FRANK HENRICH
Master Mariner

REVISED 1942 BY
THE UPSON-WALTON CO.,
CLEVELAND, OHIO


Correction for Eastern Standard Time
MAP OF
THE GREAT LAKES
Containing
ISOGONIC CURVES OF THE VARIATION OF THE COMPASS
And
DIFFERENCE BETWEEN STANDARD AND LOCAL CIVIL TIMES
From Latest Data
SPECIALLY PREPARED FOR
AZIMUTH OR TRUE BEARING OF CELESTIAL OBJECTS
From
LATITUDE 41 TO 49 INCLUSIVE
WITH MAPS
The Upson Walton Co.
Cleveland, Ohio
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DUNKIRK
MILWAUKEE
RACINE
CHICAGO
St Lawrence River
Correction for Central Standard Time

# AZIMUT

OR

# TRUE BEARING

OF

## CELESTIAL OBJECTS FOR THE GREAT LAKES,

FROM

Latitude 41° to 49° Inclusive.

WITH MAPS.

BY

FRANK HENRICH.

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By FRANK HENRICH,
DULUTH, MINN.

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# INTRODUCTION.

With this publication, the Author presents to the navigators on the Great Lakes, a set of Azimut Tables, computed and arranged especially for use on those waters. They comprise the results of a large amount of research and labor. Thirty years of continuous service as master and mate on ocean and lake ships, eight years of duty as Nautical Expert in Branch Hydrographic Office at Duluth, particularly adapt the Author for this work, which is original in conception, style and arrangement. The most recent and approved publications on the subject of azimuts in the United States, and the principal foreign maritime countries have been carefully scanned for useful suggestions; most valuable aid was rendered by Lake Captains, who took lively interest in the progress of the work, by furnishing practical advice. Owing to these several facilities, the Author is enabled to annonuce, that with this publication, the Captains and Mates on the Great Lakes possess the most simple, efficient, and modern Azimut Tables ever published.

About five years ago the Author, after a thorough examination of the Azimut Tables in use on the Great Lakes, was convinced that improvements were necessary, also that the immense maritime commerce on these inland seas, conveyed by means of modern constructed and equipped steel steamers, merited a special publication on this subject. In this opinion he was sustained by a large number of progressive navigators. The work consisted in re-computing, re-arranging, and extending the existing Azimut Tables for the latitudes 41° to 49° north. Numerous Ship Masters to whom the nature of the undertaking was explained, were enthusiastic and urged its completion at the earliest possible moment.

The Azimut Tables in use on the Great Lakes at the present time, consist of first: Hydrographic Office Azimuth Tables between 40° and 50° North inclusive, which contain the true bearings for such latitudes of objects 23° on each side of the celestial equator, for every 10 minutes of apparent time. Second: Sun's True Bearing and Azimuth Tables, Burdwood, embodying these data between the latitudes 30° to 60° of objects 23° on each side of the equinoctial, for every 4 minutes of apparent time.

The main argument against the first is the time interval of 10 minutes, which necessitates almost constant interpolation, with consequent loss of time and liability to error. Several undesirable elements enter into the construction of Burdwood's tables: 1st. They contain the true bearings for a belt around the globe between latitudes 30° and 60° of which only 9° are relevant for the Great Lakes. 2nd. When the object attains an altitude exceeding 60°, no bearings are available. 3rd. The arrangement of the tables includes the undesirable feature, that the azimuts, declination—same as—latitude, and declination—contrary to—latitude, are printed on alternate pages, rendering interpolation between latitudes a per-

plexing task, compelling the computer to turn 5 leaves to obtain the preceding or subsequent data.

In both mentioned tables: the true bearings are found to single minutes of arc, which hampers interpolation, while the values when obtained are needlessly accurate, considering the means, method, and needs of the observation. On such an unstable observatory, as a steamer in motion, it taxes the ingenuity of an experienced observer, to read bearings of the sun or other objects to a degree exact, which clearly demonstrates the superfluity of azimut tables, wherein the degree is divided into 60 parts.

Both tables furnish the azimuts of celestial objects to 23° of declination, but as the orbits of the moon and planets fluctuate about 5° on each side of the ecliptic, it is evident that bearings for these bright and important objects, when their declination exceeds the above amount, are not available.

Whatever has been said in enumerating the undesirable features of those tables for lake navigation, it should be borne in mind, that they have, and are doing loyal service, they hold the honor of being pioneers in the assistance of the navigator in his frequent task of observation. Before their appearance, it involved a lengthy and tedious computation, to find the true bearings from altitudes of the bodies and chronometer. They have been freely used in the construction of this publication, in other words, they have been built upon, as it is to be hoped, that the present work will be improved to serve future needs as they may occur, for, azimut tables have come to stay, and as long as iron and steel enter into the construction of ships, the navigator cannot afford to be without them.

In the present tables the declination has been extended to 29°, thus affording the observation of the moon and planets in their various positions, and of 88 of the 150 navigational stars contained in the Nautical Almanac for 1907.

The true bearings are given to the tenth part of a degree exact, which is sufficient for practical purposes, and converts the labor of interpolation for time, declination and latitude, into a brief, and after short experience, mental process.

The elements of latitude and declination are contained on the same page for 36 minutes of time, divided into nine epochs of 4 minutes each. The tables commence at 11 hours 56 minutes and continue until the rising or setting of the object. All bearings decrease from the top towards the bottom of the page, both as a whole, and during each specific time interval, in other words, similar quantities occupy adjacent spaces. The azimuts for apparent noon have been excluded, for as every navigator is aware, the object is due south (true) at this moment, no matter what the latitude or declination may be.

The azimuts are augmented by two maps and numerous auxiliary tables, a proper description of which will be found under "Explanation and Use of the Tables."

All parts of the tables are prominently exhibited before the student, by an abundant number of examples for practice, distributed over all parts of the Great Lakes, by selecting the important objects on the celestial sphere, and

covering all subjects related to azimuts. This renders the publication an excellent guide for self instruction.

Incidentally it may be stated that outside of the Great Lakes, the tables are available in the River and Gulf of St. Lawrence, thence south as far as New York. They also cover the entire Black Sea, Sea of Azov, Adriatic Gulf, the coasts of France on the Mediterranean, Bay of Biscay, and English Channel, the North and West Coasts of Spain and numerous others.

The sincere thanks of the Author are due to Mr. Oscar Erickson, Assistant at Branch Hydrographic Office, Duluth, who designed the first skeleton for the tables, for computation and general work. Also to that excellent seaman and navigator the late Captain Robert Smith, for practical suggestions during the constructive period of the publication. Captains Hugh O. Miller, Neil Campbell, John F. Parke, C. J. Grant, C. D. Secord, J. P. Thompson and numerous others took active interest in the work.

The following publications were used to assist in the construction of the tables:

Hydrographic Office Publications Nos. 106 and 120,
Sun's True Bearing or Azimuth Tables, Burdwood,
Tables Des Azimuts Du Soleil, De La Lune, Tout Les Asters, etc., par F. LaBrosse, Paris, 1902.
Tables Du Point Auxiliare, par F. Souillagouet, Paris, 1902,
Bowditch Practical Navigator,
Raper and Norie's Epitomes on Navigation,
American, British, French, and German Nautical Almanacs from 1905 to 1908,
Hydrographic Office Charts Nos. 1684 and 2100.

The Publishers have done their best, with disregard to cost, and produced a substantial and attractive book. The Author hopes that the work may be accorded a favorable reception from the American and Canadian Navigators on the Great Lakes, for whose special benefit it has been issued.

Every person using this work is earnestly requested to acquaint the Author of errors which may have entered from constructive or typographical causes.

Duluth, December, 1906.

FRANK HENRICH,
Master Mariner.

## INTRODUCTION TO REVISED EDITION

This publication has proven so popular that The Upson-Walton Co., Cleveland, Ohio, purchased the plates and right of publication in order that the book might be brought up to date in every respect. The isogonic chart has been corrected to 1926. Due to changes in the Nautical Almanac it was necessary to change practically all of the examples so that they would illustrate clearly the method of using the tables. Advantage was taken of this opportunity to correct the few errors that were detected in the tables in the original book.

GLENN H. SHELDON.

Cleveland, October, 1926.

## INTRODUCTION TO 1942 EDITION

In this edition a few corrections have been made in the auxilary tables and the isogonic chart has been brought up date. No changes were made in the problems.

The Upson-Walton Company

Cleveland, August, 1942.

# EXPLANATION AND USE OF TABLES.

These tables, embodying true bearings for latitudes 41° to 49°, inclusive, of objects 29° on each side of the celestial equator, for every four minutes, consist of two parts:

Part I. Containing these data, when the declination of the object, is of the same name as the latitude, or, when it is situated north of the celestial equator;

Part II. Giving the true bearing, when the declination of the object is of the opposite name as the latitude, or, when the same is south of the celestial equator.

The same description serves for both: on each page are found, on the top left corner, the times A. M., or the Hour Angle East, on the top right corner, the times P. M. or the Hour Angle West, which limit the contents of the page. The horizontal column at the top and bottom of each page contains the declination, the character of which, North or South, is found above the top column, the former marked: Declination—same as—Latitude, the latter: Declination —opposite to—Latitude. The first vertical column on the left of each page embraces the times A. M. or the Hour Angle East, for each paragraph of the nine different epochs. In the next vertical column are given the latitudes from 49° to 41°, for each specified epoch. Then follow the azimuts in the body of the page, to the tenth of a degree exact, with a small but appreciable space between each three lines, and a larger between each separate paragraph: The next vertical column to the right again contains the latitudes. The last vertical column furnishes the times P. M. or Hour Angle West. In both parts the quantity of the bearings decrease from the top to the bottom of each page as a whole, and in each individual paragraph. The last paragraph at the bottom of each page, is repeated on top the next.

In the succeeding instructions the terms: Time and Hour Angle, also Azimut and True Bearing, are considered as synonyms, and used indiscriminately. The latitude referred to throughout is invariably North.

The tables give the azimut or true bearing only, it remains for the observer to apply the proper characteristics: first being situated in north latitude, the azimut is always named from north; second, with time a. m., or hour angle East, the true bearing must necessarily be located in the Eastern semi-circle, and should be designated as such; when the time shows p. m., or hour angle West, the azimut is in the western semi-circle, and must be distinguished accordingly.

To find the true bearing from the tables, the time, latitude of the ship, and declination of the object having been ascertained, open the tables for the computed time, and in the paragraph corresponding to the hours and minutes, the true bearing is taken at the intersection of the columns which contain the latitude and declination. For example: time 7:20 a. m., latitude 45°, declination 19° N., required the true bearing. Part I, page 19 the azimut is found

N. 89° 9 E. Or, Hour Angle 4:20 West, latitude 45°, declination 19° South, in Part II, page 51 the true bearing is given N. 120° 9 W.

In the following instructions it is assumed that the ship is provided with a suitable clock or watch, showing the standard time on which the ship is navigated, either Central or Eastern, with sufficient accuracy (within 1 minute or less), to assure reliable results. A copy of the Nautical Almanac for the current year, which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., three years in advance, for the small sum of thirty cents, is also needed, and no modern ship should be without it. On ships not equipped with this publication, the navigator is restricted to the use of the sun and the north star for his observations Each part of this publication, required in connection with these tables, will be thoroughly discussed, as the needs appear in the subsequent paragraphs.

Under the head "Auxiliary Tables," on page 60 of this publication, in tables designated E and F, is given the approximate declination of the sun and equation of time, for every day of the year, the former to tenths of degrees the latter to tenths of minutes. They will be found to differ but slightly from the same elements in the Nautical Almanacs of future years, and have been included in this work, for the purpose of enabling the navigator to obtain azimuts of the sun, when no nautical almanac is on hand. Whenever possible the same elements from the nautical almanac should be preferred.

The isogonic map, placed in front of this volume, covers the territory of the Great Lakes, and furnishes the following data for all observations by means of simple inspection: latitude, variation, and correction to convert standard time into Local Civil Time; the difference for Eastern Standard and Local Civil Time, corresponding to all longitudes is found near the top of the map; the correction from Central Standard Time into Local Civil Time is given near the bottom. To each correction the proper sign, + to add, − to subtract, is prefixed.

To preserve uniformity in the calculations, the initial time given throughout the examples for practice is Central Standard, they are computed and all corrections applied, to the nearest full minute.

When the computed time or hour angle corresponds within one minute with the time in the tables, no interpolation is made, unless the change between the values is too large to neglect. When the time or hour angle differs two minutes from the nearest in the tables, (the largest possible difference), interpolation is invariably resorted to.

The interpolation for changes in azimut, between full degrees of latitude and declination in the tables, will be carried out to quarter degrees where necessary. In general practice it is sufficient to interpolate for half degrees.

From inspection of the tables it is evident, that objects close to the horizon change their bearings slowly, while as they gain in altitude, the changes become of larger proportion, wherefore the former are under all circumstances the most favorable for observation. But the seaman cannot always choose, he has to use what is available, and as an unfavorable object is infinitely better than none, it must be employed, and more or less interpolation is necessary.

Owing to the advantageous arrangement of the tables, in having all the elements, which determine the value of the azimuts on the same page the changes in the individual adjacent quantities are small, wherefore the tables are especially adapted to facilitate interpolation, if both latitude and declination differ half a degree from the full degrees in the tables, the true bearing is found at sight, or by the mental process of taking the mean between the two factors, of the four quantities determining the observation, which differ least; or as follows:

Local Apparent Time: 2 h. 32 m., p. m. latitude 42° 30', declination 9° 30' N., the true bearing is required.

From Part I, page 10 is obtained,

Latitude 43° declination 9° and 10° true bearings 124.4° and 123.6°.

Latitude 42° declination 9° and 10° true bearings 123.6° and 122.8°.

It appears at a glance that the mean between the four quantities or the required azimut is N. 123.6° W., or employing table Part II,

8h. 40m. a. m. local apparent time, latitude 43° 30', declination 17° 30' S, the true bearing is found from Part II, page 47,

Latitude 44° declination 17° and 18° azimuts 131.0° and 131.6°

Latitude 43° declination 17° and 18° azimuts 130.8° and 131.4°

the true bearing required is N. 131.2° E.

The celestial objects, which offer their services to the navigator consist of the Sun, Moon, the four principal planets, Venus, Mars, Jupiter, Saturn, and those stars within 29° of the celestial equator, of which about 80 are available from the Nautical Almanac for 1907.

It seems unnecessary to remark, that the examples hereafter given, being calculated for 1907, a future epoch, are not the results of actual observations, but have been artificially created to serve the occasion.

### To Find the True Bearing of the Sun.

Azimuts of the Sun, as the most conspicuous object in the heavens, will be considered first. To conduct the observation it is necessary to determine the following data: latitude, variation, correction for longitude, declination of the sun, and equation of time; the three first are taken from the isogonic chart, the latter two from the Nautical Almanac or when this is not on hand, from tables E and F. On pages 6 to 29 of each month in the Nautical Almanac, are found the declination of the sun, and equation of Time for each day, the former is marked N., when the sun is north of the celestial equator, S., when he is south of the equinoctial; the equation of time is prefixed with a + or − sign and has to be applied accordingly.

The Central Standard Time of observation and the sun's bearing by compass having been ascertained, the calculation is conducted as follows: on the Central Standard Time apply the correction for longitude from the isogonic chart, obtaining Local Civil Time, to which add or substract the equation of time as contained in the Nautical Almanac, this gives Local Apparent Time, with it, the latitude of the ship, and the declination of the sun, the true bearing is taken from the tables, to which apply the variation, obtaining the sun's magnetic bearing, the difference between the latter and the compass bearing is the deviation.

Example 1. May 2, 1926, Sand Island, Lake Superior, bearing East 3 miles at 5 h. 29 m. a. m., Central Standard Time, the sun bore N. 71° E. by compass; required the deviation.

From isogonic chart is found: Latitude 47°, variation 5° E. correction for longitude minus 4 m. From Nautical Almanac, declination of the sun 15° N., equation of time 3 m. to add.

| | |
|---|---|
| Central Standard Time | 5 h. 29 m. a. m. May 2. |
| Correction for Longitude | — 4 m. |
| Local Civil Time | 5 h. 25 m. a. m. May 2. |
| Equation of Time | + 3 m. |
| Local Apparent Civil Time | 5 h. 28 m. a. m. May 2. |
| Sun's True Bearing | N. 74.0° E. Page 27, Part I. |
| Variation | 5.0° E. |
| Sun's Magnetic Bearing | N. 69.0° E. |
| Sun's Bearing on Compass | N. 71.0° E. |
| Deviation | 2.0° W. |

Example 2. June 22, 1926, Long Point, Lake Erie, bearing West 3 miles distant, at 5 h. 58 m. a. m., Central Standard Time, the sun bore by compass N. 75° E.; required the deviation.

From isogonic chart the latitude is 42° 30′, variation 6.0° W., correction for longitude 40 minutes to add. From Nautical Almanac the declination of the sun is 23½° N., equation of time 2 minutes to subtract.

| | |
|---|---|
| Central Standard Time | 5 h. 58 m. a. m. June 22. |
| Correction for Longitude | + 40 m. |
| Local Civil Time | 6 h. 38 m. a. m. June 22. |
| Equation of Time | — 2 m. |
| Local Apparent Civil Time | 6 h. 36 m. a. m. June 22. |
| Sun's True Bearing | N. 77.7° E. Page 23, Part I. |
| Variation | 6.0° W. |
| Sun's Magnetic Bearing | N. 83.7° E. |
| Sun's Bearing by Compass | N. 75.0° E. |
| Deviation | 8.7° E. |

Example 3. November 27, 1926. Point Aux Barques, Lake Huron, bearing West 10 miles distant, at 3 h. 33 m. p. m., Central Standard Time, the sun bore N. 120.0° W. by compass; required the deviation.

From isogonic chart the latitude is 44°, variation 5° W., correction for longitude 30 minutes to add. From Nautical Almanac the declination of the sun is 21° S., the equation of time 13 m. to add.

| | |
|---|---|
| Central Standard Time | 3 h. 33 m. p. m. November 27. |
| Correction for Longitude | + 30 m. |
| Local Civil Time | 4 h. 03 m. p. m. November 27. |
| Sun's True Bearing | N. 122.9° W. Page 49, Part II. |
| Variation | 5.0° W. |
| Sun's Magnetic Bearing | N. 117.9° W. |
| Sun's Bearing by Compass | N. 120.0° W. |
| Deviation | 2.1° E. |

### To Find the Error of the Compass From Bearings of the Moon.

The elements needed for this observation consist of the latitude, variation, and correction for longitude, taken as formerly from the isogonic chart. From the Nautical Almanac are obtained:

Sidereal Time of Oh. Civil Time at Greenwich (which is equivalent to the Right Ascension of the Mean Sun — 12 hours),

Correction for Longitude from Greenwich;

Right Ascension and Declination of the Moon.

The Sidereal Time of Oh. Civil Time at Greenwich is found on Page 2 and 3 of the Nautical Almanac for every day of the year and must be augmented by the correction for longitude from Greenwich. This correction is taken from the bottom of Pages 2 and 3 of the Nautical Almanac. The Right Ascension and Declination of the Moon are given for every 2 hours of Greenwich Civil Time on Pages 30 to 75 of the Nautical Almanac.

Throughout the calculation Civil Time must be employed.

The Civil Day commences at midnight and comprises the 24 hours until the following midnight. The hours are counted in a continuous series from 0 to 24. Therefore, for purposes of computation, if the time is a. m. the watch time is used. If the time is p. m., 12 hours are added to the watch time.

The Greenwich Civil Time is required to obtain the elements from the Nautical Almanac. It is found by adding 6 hours to the Central Standard Time.

### To Find the Hour Angle of the Moon.

Apply the correction (taken from the isogonic chart) for Longitude to the Central Standard Time. The result is Local Civil Time. If a. m., use this time. If p. m., add 12 hours.

Add 6 hours to the Central Standard Time, if a. m. or 18 hours if p. m., to obtain Greenwich Civil Time.

To the Local Civil Time add the Right Ascension of the Mean Sun plus 12 hours and the correction taken from the bottoms of pages 2 and 3 of the Nautical Almanac. This sum is the Local Sidereal Time. From this sum subtract the Right Ascension of the Moon. The remainder is the Hour Angle of the Moon. Throughout the calculation 24 hours may be added or subtracted without affecting the accuracy of the results.

### To Find the True Bearing of the Moon From the Hour Angle.

The Hour Angle of the Moon, Planets and Stars is counted, beginning from the Meridian of the observer, westward from 0 to 24 hours, back to the Meridian, wherefore the navigator in his calculation, may obtain any value between these limits for the Hour Angle.

If the computed Hour Angle is less than 12 hours, the moon is situated West of the Meridian, with the time designated by the Hour Angle, the p. m. Column of the azimut tables is entered, and the true bearing found at the intersection of latitude and declination columns, it is named West.

If the Hour Angle exceeds 12 hours, the moon is EAST of the meridian, subtract 12 hours from the Hour Angle, with the time thus obtained, enter the a. m. column of the azimut tables, where the columns of latitude and declination cross, take the true bearing which is named EAST.

Example 4. May 6, 1926, 9 h. 30 m. a. m., Central Standard Time, Thunder Bay Island, Lake Huron, 2 miles distant, bearing W. N. W., the moon bore by compass N. 135.0° W., required the deviation.

The isogonic chart shows the latitude 45°, correction for longitude 27 minutes to add, variation 5.0° W; from the Nautical Almanac the Sidereal Time of Oh. Civil Time (R. A. M. S. plus 12 h) is 14 h. 52 m., correction 3 m. (always additive). Right Ascension of moon 22 h. 34 m., and declination of the moon 13° S.

**May 6, 9 h. 30 m. a. m. Central Standard Time, 15 h. 30 m., Greenwich Civil Time, May 6.**
**+ 27 m. Correction for Longitude.**
**9 h. 57 m. Local Civil Time, May 6.**
**14 h. 52 m. Right Ascension of Mean Sun plus 12 hours.**
**3 m. Correction applied to R. A. M. S. plus 12 hours.**
**24 h. 52 m. Local Sidereal Time.**
**22 h. 34 m. Right Ascension of Moon, 15 h. 30 m. G. C. T. May 6.**
**2 h. 18 m. Moon's Hour Angle West.**

| | | |
|---|---|---|
| Moon's True Bearing | N. 142.8° W. | Page 42, Part II. |
| Variation | 5.0° W. | |
| Moon's Magnetic Bearing | N. 137.8° W. | |
| Moon's Bearing by Compass | N. 135.0° W. | |
| Deviation | 2.8° W. | |

Example 5. October 19, 1926, 1 h. 00 m. a. m. Central Standard Time, when Eagle Harbor, Lake Superior, bore S., 5 miles distant, the bearing of the Moon by compass was N. 138.0° W. Required the deviation.

From isogonic map the latitude is 47.5°, variation 1.5° E., correction for longitude 7 minutes to add. The Nautical Almanac supplies Sidereal Time of Oh. Civil Time at Greenwich (Right Ascension of Mean Sun plus 12 hours) October 19, as 1 h. 47 m., correction taken from bottom of page for 7 hours, 1 m., (always additive), Right Ascension of the Moon 0 h. 1 m., the declination 5° S.

**Oct. 19 1 h. 00 m. a. m. Central Standard Time, 7 h. 00 m. Greenwich Civil Time, Oct. 19.**
**+ 07 m.**
**1 h. 07 m. Local Civil Time October 19.**
**1 h. 47 m. Right Ascension of Mean Sun plus 12 hours, October 19.**
**1 m. Correction from bottom of page 2.**
**2 h. 55 m. Local Sidereal Time.**
**0 h. 1 m. Right Ascension of Moon.**
**2 h. 54 m. Moon's Hour Angle W.**

| | | |
|---|---|---|
| Moon's True Bearing | N. 131.7° W. | Page 44, Part II. |
| Variation | 1.5° E. | |
| Moon's Magnetic Bearing | N. 133.2° W. | |
| Moon's Bearing by Compass | N. 138.0° W. | |
| Deviation | 4.8° E. | |

Example 6. July 27, 1926, 11 h. 00 m., p. m., Central Standard Time, when Kenosha Pierhead Light bore N. W. & W. 11 miles distant, the moon was observed to bear N. 115° E. by compass, required the deviation.

From isogonic chart the latitude is 42.5°, correction for longitude 9 minutes to add, variation 1° E. The Nautical Almanac supplies: Right Ascension of Mean Sun plus 12 hours as 20 h. 20 m., correction from bottom of Page II as 1 m., Moon's Right Ascension 23h. 17 m., Moon's Declination 9.5° S.

July 27 11 h. 00 m. p. m. Central Standard Time, 5 h. 00 m. Greenwich Civil Time, July 28.
+ 9 m. Correction for Longitude.
12 h. 00 m. To convert p. m. reading to series 0 h. to 24 h.
23 h. 09 m. Local Civil Time, July 27.
20 h. 20 m. Right Ascension of Mean Sun plus 12 hours.
43 h. 29 m. Local Sidereal Time.
23 h. 17 m. Right Ascension of Moon.
20 h. 12 m. Moon's Hour Angle.
12 h. Subtract.
8 h. 12 m. E. Lunar Time a. m.

| | | |
|---|---|---|
| Moon's True Bearing | N. 120.4° E. | Page 46, Part II. |
| Variation | 1.0° E. | |
| Moon's Magnetic Bearing | N. 119.4° E. | |
| Moon's Bearing by Compass | N. 115.0° E. | |
| Deviation | 4.4° E. | |

### To Find Error of the Compass from Bearings of a Planet.

The following elements are essential for the observation: latitude, variation, and correction for longitude, as formerly obtained from the isogonic chart. Sidereal Time of Oh. Civil Time at Greenwich (Right Ascension of Mean Sun plus 12 hours), and Acceleration for time elapsed since Oh. Greenwich Civil Time (correction at bottom of pages 2 and 3) are taken from the Nautical Almanac as explained in previous instructions. The Right Ascension and Declination of the Planets are found for each day for Oh. Greenwich Civil Time on pages 78 to 93 of the Nautical Almanac. The declination of the planets is designated + when North, — when South.

Finding the Hour Angle and eventually the true bearing of a planet is conducted in the same manner as previously explained for the Moon.

Example 7. July 29, 1926, 3 h. 30 m. a. m., Whitefish Point, Lake Superior, bearing S. S. E. 2 miles distant. Venus was observed to bear N. 65° E., by compass; required the deviation.

From isogonic chart the latitude is 46.8°, variation 3° W., correction for longitude 20 minutes to add. In the Nautical Almanac, the Right Ascension of the Mean Sun plus 12 hours is 20 h. 24 m., acceleration for 9 h. 30 m., 2 m to add. The Right Ascension and Declination of Venus are 6 h. 24 m. and 22.5° N.

July 29, 3 h. 30 m. a. m. Central Standard Time, 9 h. 30 m. Greenwich Civil Time, July 29.
+ 20 m. Correction for Longitude.
3 h. 50 m. Local Civil Time, July 29.
20 h. 24 m. Right Ascension of Mean Sun plus 12 hours.
2 m. Correction from bottom of page 2, Nautical Almanac.
24 h. 16 m. Local Sidereal Time.
—6 h. 24 m. Right Ascension of Planet.
17 h. 52 m. Hour Angle of Planet
12 h. Subtract.
5 h. 52 m. Planets Time A. M.

| | | |
|---|---|---|
| Planets True Bearing | N. 72.8° E. | Page 25, Part I. |
| Variation | 3.0° W. | |
| Planets Magnetic Bearing | N. 75.8° E. | |
| Planets Bearing by Compass | N. 65.0° E. | |
| Deviation | 10.8° E. | |

Example 8. July 31, 1926, Pigeon Island Light, Lake Ontario, bearing North 4 miles distant at 11 h. 30 m., p. m., the planet Mars bore N. 91° E. by compass, required the deviation.

The isogonic chart gives the latitude 44°, variation 10° W., correction for longitude 54 minutes to add. The Nautical Almanac supplies: Right Ascension of Mean Sun plus 12 hours as 20 h. 35 m., acceleration for 5 h. 30 m. Greenwich Civil Time 1 m. to add. Right Ascension of Mars 1 h. 55 m., the declination of Mars, 9° N.

July 31,11 h. 30 m. p. m. Central Standard Time, 5 h. 30 m. Greenwich Civil Time, August 1.

| | |
|---|---|
| 0 h. 54 m. | Correction for Longitude. |
| 12 h. 00 m. | Add. |
| 23 h. 24 m. | Local Civil Time, July 31. |
| 20 h. 35 m. | Right Ascension of Mean Sun plus 12 hours. |
| 1 m. | Correction from bottom of page 2, Nautical Almanac. |
| 44 h. 00 m. | Local Sidereal Time. |
| −1 h. 55 m. | Right Ascension of Mars. |
| 42 h. 05 m. | Hour Angle. |
| 24 h. | Subtract. |
| 18 h. 05 m. | |
| 12 h | Subtract |
| 6 h. 05 m. | Hour Angle E. |

| | |
|---|---|
| Planet's True Bearing | N. 84.3° E. |
| Variation | 10.0° W. |
| Planet's Magnetic Bearing | N. 94.0° E. |
| Planet's Bearing by Compass | N. 91.0° E. |
| Deviation | 3.0° E. |

Example 9. September 21, 1926, 1 h. 00 m. a. m., at Bar Point, Lake Erie, the Planet Jupiter was observed to bear N. 120° W. by compass: required the deviation.

The isogonic chart gives: latitude 42°, variation 2.5° W., correction for longitude 27 m. to add. The Nautical Almanac furnishes: Right Ascension of Mean Sun plus 12 hours, as 23 h. 56 m., acceleration for 7 h., G. C. T., as 1 m. to add. Jupiter's Right Ascension as 21 h. 24 m., declination 16.5° S.

Sept. 21, 1 h. 00 m. a. m., Central Standard Time, 7 h. Greenwich Civil Time, September 21.

| | |
|---|---|
| + 27 m. | Correction for Longitude |
| 1 h. 27 m. | Local Civil Time September 21. |
| 23 h. 56 m. | Right Ascension of Mean Sun plus 12 hours. |
| 1 m. | Correction from bottom of page 2. |
| 25 h. 24 m. | Local Sidereal Time. |
| 21 h. 24 m. | Right Ascension of Jupiter. |
| 4 h. 00 m. | Planet's Time P. M. |

| | | |
|---|---|---|
| Jupiter's True Bearing | N. 122.6° W. | Page 49, Part II. |
| Variation | 2.5° W. | |
| Planet's Magnetic Bearing | N. 120.1° W. | |
| Planet's Bearing by Compass | N. 120.0° W. | |
| Deviation | .1° W. | |

Example 10. August 29, 1926, 8 h. 00 m. p. m., Cape Croker, Georgian Bay, bearing S. W. 2 miles distant, the planet Saturn was observed to bear N. 121° W. by compass; required the deviation.

The isogonic chart has: latitude 45°, variation 7° W., correction for longitude 36 m. to add. The Nautical Almanac supplies: Right Ascension of Mean Sun plus 12 h. as 22 h. 30 m., acceleration for 2 h., G. C. T., as Om. Right Ascension of Saturn 15 h. 14 m., declination 16° S.

**Aug. 29, 8 h. 00 m. p. m., 2 h. 00 m. Greenwich Civil Time, August 30.**

**+ 36 m. Correction for Longitude.**

**8 h. 36 m. p. m. August 29.**

**12 h.**

**20 h. 36 m. Local Civil Time August 29.**

**22 h. 30 m. Right Ascension of Mean Sun plus 12 hours.**

**43 h. 06 m.**

**24 h. 00 m. Subtract.**

**19 h. 06 m. Local Sidereal Time.**

**15 h. 14 m. Planet's Right Ascension.**

**3 h. 52 m. Planet's Hour Angle W.**

| | | |
|---|---|---|
| **Planet's True Bearing** | **N. 124.3° W.** | **Page 49, Part II.** |
| **Variation** | **7.0° W.** | |
| **Saturn's Magnetic Bearing** | **N. 117.3° W.** | |
| **Saturn's Bearing by Compass** | **N. 121.0° W.** | |
| **Deviation** | **3.7° E.** | |

## The Star Map.

The star map at the end of this book, contains the stars to the 3rd magnitude, the most important stars of the 4th magnitude, and a few of the fifth, from the North Pole to 30° South declination. The outside circle is divided into 24 hours, corresponding to the Right Ascension of the stars, each hour is subdivided into spaces of 5 minutes. The dotted lines from the outside circle to the pole, represent circles of declination, each dot signifying one degree. The celestial equator is drawn thicker than the parallels of declination, the latter are drawn for every 10 degrees. All stars situated inside the celestial equator on the map have north declination, all outside south. Any star from the Nautical Almanac can be located on the map, by its Right Ascension and Declination. Not all the stars on the map can be found in the almanac, but a sufficient number of important stars are given therein, ample to serve the needs of the navigator. The stars on the celestial sphere are divided into groups called constellations, the most important of which, for instance, Ursa Major (Great Bear), Taurus (Bull), Orion etc., are known to most observers. Each individual star in the constellation, is designated by either a Greek letter or number, and some of the most important have popular names attached

## To Find the Deviation of the Compass from the Bearing of a Fixed Star.

The method of finding the Hour Angle of a Fixed Star and hence its true bearing does not differ from that employed for the same purpose, in the case of a Planet. As usual the latitude, variation, and correction for longitude are

taken from the isogonic chart. The Right Ascension of the Mean Sun plus 12 h. (Sidereal Time of Oh. Civil Time), correction for acceleration of Sidereal Time on Mean Time for the hours and minutes since Oh. Greenwich Civil Time, the Right Ascension and Declination of the star, are provided by The Nautical Almanac, the two latter elements on pages 94 to 99. The declination is prefixed by a plus sign, when the star is situated north of the celestial equator, by a minus sign, when south.

Example 11. May 5, 1926, off Detour, Lake Huron, at 8 p. m., Central Standard Time, Sirius (a Canis Majoris) bore N. 111° E. by compass; required the deviation.

Latitude 46°, variation 5° W., correction for longitude 24 minutes to add, as contained on isogonic chart. The Right Ascension of the Mean Sun plus 12 h. equals 14 h. 52 m., correction from bottom of page 2 for 2 h. Greenwich Civil Time is 0 m., Right Ascension and Declination of Sirius are 6 h. 42 m. and 16½° S.

May 5, 8 h. 00 m. p. m. Central Standard Time. Greenwich Civil Time 2 h. 00 m., May 6.
24 m. Correction for Longitude.
12 h. 00 m. To convert p. m. time to 0 h. to 24 h. series.
20 h. 24 m. Local Civil Time, May 5.
14 h. 52 m. Right Ascension of Mean Sun plus 12 hours.
35 h. 16 m.
24 h. 00 m. Subtract.
11 h. 16 m. Local Sidereal Time.
6 h. 42 m. Right Ascension of Sirius.
4 h. 34 m. Hour Angle W.

| | | |
|---|---|---|
| Star's True Bearing | N. 116.8° W. | Page 51, Part II. |
| Variation | 5.0° W. | |
| Star's Magnetic Bearing | N. 111.8° W. | |
| Sirius' Bearing by Compass | N. 111.0° W. | |
| Deviation | .8° W. | |

Example 12. July 24, 1926. 11 h. 30 m. p. m., Central Standard Time, Milwaukee Pierhead Light bearing W. x N. 7 miles distant, Antares (a Scorpii) was observed to bear N. 142° W. by compass, required the deviation.

Latitude 43°, variation 2° E., correction for longitude 9 minutes to add, from isogonic chart. The Nautical Almanac gives: Right Ascension of Mean Sun plus 12 h. as 20 h. 08 m., acceleration for 5 h. 30 m. Greenwich Civil Time (from bottom of Page 2) 1 m. to add, the Right Ascension of Antares is 16 h. 25 m., the declination is 26¼° S.

July 24, 11 h. 30 m. p. m. Central Standard Time, 5 h. 30 m. Greenwich Civil Time, July 25.
9 m. Correction for Longitude.
11 h. 39 m. p. m.
12 h. 00 m. To convert p. m. time to 0 h. to 24 h. series.
23 h. 39 m. Local Civil Time, July 24.
20 h. 08 m. Right Ascension of Mean Sun plus 12 hours.
01 m. Correction from bottom of page 2.
43 h. 48 m.
24 h. Subtract.
19 h. 48 m. Local Sidereal Time.
16 h. 25 m. Right Ascension of Antares.
3 h. 23 m. Hour Angle W.

| | | |
|---|---|---|
| Star's True Bearing | N. 135.6° W. | Page 47, Part II. |
| Variation | 2.0° E. | |
| Star's Magnetic Bearing | N. 137.6° W. | |
| Antares' Bearing by Compass | N. 142.0° W. | |
| Deviation | 4.4° E. | |

Example 13. November 8, 1926, 10 h. 00 m. p. m., Central Standard Time, when Devil's Island, Lake Superior, bore South, 2 miles distant, the stars Betelgeux (Alpha Orionis) and Rigel (Beta Orionis) were observed simultanlously to bear N. 93° E. and N. 112° E., it is desired to find the deviation from both.

Latitude 47°, variation 4° E., correction for longitude 3 minutes to subtract. Right Ascension of the Mean Sun plus 12 h. for November 9, 3 h. 10 m., correction for 4 h. Greenwich Civil Time is 1 m. to add. Right ascension of Betelgeux 5 h. 51 m., declination 7½° N., Right Ascension of Rigel 5 h. 11 m., declination 8¼° S.

| | | | |
|---|---|---|---|
| Nov. 8, | 10 h. 00 m. p. m. Central Standard Time. | 4 h. Greenwich Civil Time November 9. | |
| | — 3 m. Correction for Longitude. | | |
| | 9 h. 57 m. | | |
| | 12 h. 00 m. Add to convert p. m. to 0 h. to 24 h. series. | | |
| | 21 h. 57 m. Local Civil Time November 8. | | |
| | 3 h. 10 m. Right Ascension of Mean Sun plus 12 hours. | | |
| | 1 m. Correction from bottom of page 2, Nautical Almanac. | | |
| | 25 h. 08 m. Local Sidereal Time | 25 h. 08 m. | |
| | 5 h. 51 m. Right Ascension of Betelgeux | 5 h. 11 m. R. A. of Rigel. | |
| | 19 h. 17 m. Hour Angle | 19 h. 57 m. Hour Angle. | |
| | 12 h. Subtract | 12 h. Subtract. | |
| Betelg. | 7 h. 17 m. Star Time A. M. | Rigel | 7 h. 57 m. Star Time A. M. |

| | | | |
|---|---|---|---|
| True Bearing of Betelgeux | N. 99.2° E., | True Bearing of Rigel | N. 117.7° E. |
| Variation | 4.0° E., | Variation | 4.0° E. |
| Magnetic Bearing of Betelg. | N. 95.2° E., | Magnetic Bearing of Rigel | N. 113.7° E. |
| Bear. by Comp. of Betelgeux | N. 93.0° E., | Bear. by Comp. of Rigel | N. 112.0° E. |
| Deviation from Betelgeux | 2.2° E., | Deviation from Rigel | 1.7° E. |

Example 14. October 2, 1926, 11 h. 00 m. p. m., Central Standard Time, when Lake Huron Lightship bore South, 1 mile distant, the simultaneous bearings of Aldebaran (Alpha Tauri) and Altair (Alpha Aquilae) were respectively N. 95° E. and N. 99.5° W. by compass, required the deviation.

From isogonic map: latitude 43°, variation 4° W., correction for longitude 30 minutes to add. The Nautical Almanac supplies: Right Ascension of Mean Sun plus 12 h. as 0 h. 44 m., acceleration for 5 h. Greenwich Civil Time as 1 m. to add; Right Ascension of Aldebaran 4 h. 31 m., declination 16⅓° N; Right Ascension of Altair 19 h. 47 m., declination 8⅔° N.

| | | |
|---|---|---|
| Oct. 2, | 11 h. 00 m. p. m. Central Standard Time. | 5 h. 00 m. Greenwich Civil Time Oct. 3. |
| | + 30 m. Correction for Longitude. | |
| | 11 h. 30 m. | |
| | 12 h. Add to convert p. m. time to 0 h. to 24 h. series. | |
| | 23 h. 30 m. Local Civil Time, October 2. | |
| | 0 h. 44 m. Right Ascension of Mean Sun plus 12 hours. | |
| | 1 m. Correction from bottom of page 2, Nautical Almanac. | |
| | 24 h. 15 m. Local Sidereal Time. | 24 h. 15 m. Local Sidereal Time. |
| | 4 h. 31 m. Aldebaran's Right Ascension | 19 h. 47 m. Altair's R. A. |
| | 19 h. 44 m. Hour Angle. | 4 h. 28 m. Altair's Hour Angle W. |
| | 12 h. Subtract. | |
| | 7 h. 44 m. Star's Time E. or A. M. | |

| | | | |
|---|---|---|---|
| Aldebaran's True Bearing | N. 95.4° E., | Altair's True Bearing | N. 99.5° W. |
| Variation | 4.0° W. | Variation | 4.0° W. |
| Aldebaran's Mag. Bearing | N. 99.4° E., | Altair's Mag. Bearing | N. 95.5° W. |
| Aldebaran's Bear. by Comp. | N. 95.0° E., | Altair's Bear. by Comp. | N. 99.5° W. |
| Deviation from Aldebaran | 4.4° E., | Deviation from Altair | 4.0° W. |

## AUXILIARY TABLES.

### Tables A and B Pages 58-59.

These tables contain the true bearing at true rising and setting, of the centers of objects, within the limits of the azimut tables, table **A** when the declination of the object is of the same name as the latitude, table **B** when the object is situated south of the celestial equator. In each table the values are supplements of the other for the same latitudes and declinations.

### True Rising and Setting of the Sun.

For an observer, elevated between 20 and 30 feet above lake level, (the average height of a steamer's pilot house) the sun's center is in the true horizon, when his lower limb attains an altitude of 20 minutes above the visible horizon, this is a trifle more than the semidiameter of the sun, and can be easily estimated by the eye; one or several bearings taken at this time will present a fair average of the azimut.

To obtain the deviation of the compass, from a bearing of the sun at true rising and setting: the necessary elements consist of latitude, variation, and declination of the sun.

Example 15. May 5, 1907, Two Harbors Lake Superior, bearing N. W. 2 miles distant, the sun was observed to rise by compass N. 70° E., required the deviation?

From isogonic chart the latitude is 47°, variation 7° E., the declination of the sun as given by the Nautical almanac is 16° N.

Entering table **A** with latitude and declination the true bearing of the sun is found to be ..... N. 66.2° E.

| | |
|---|---|
| Variation..... | 7 0° E. |
| Sun's Magnetic Bearing.... | N. 59.2° E. |
| Sun's Bearing by Compass | N. 70 0° E. |
| Deviation..... | 10.8° W. |

**True Rising and Setting of the Moon.**—To an observer placed from 20 to 30 feet above lake level, owing to the effects of dip, refraction and parallax, when the upper limb of the noon meets the visible horizon her center is elevated a few minutes of arc above the true horizon, which restricts the observation to a perfect clear horizon and immediate bearing. From this it follows that, the higher the observer is situated, the more favorable his position for obtaining a reliable bearing by compass.

To find the deviation of the compass from a bearing of the moon at true rising or setting, the approximate Greenwich Mean Time, latitude, variation, and declination of the moon must be known.

Example 16. June 27, 1926 about 10 p. m., Central Standard Time, Thunder Cape, Lake Superior, bearing N. x E. 3 miles distant, the rising moon was observed to bear N. 125° E. by compass, required the deviation.

Latitude 48½° variation 1.5° E., Approximate Greenwich Civil Time 4 h., June 28; the corresponding declination of the moon 20⅓° S., from which the moon's true bearing from table B. is found:

| | |
|---|---|
| ..... | N. 121.6° E. |
| Variation ..... | 1.5° E. |
| Moon's Magnetic Bearing..... | N. 120.1° E. |
| Moon's Bearing by Compass..... | N. 125.0° E. |
| Deviation..... | 4.9° W. |

### True Rising and Setting of the Planets and Fixed Stars.

The parallax and diameter of a planet are too small, to affect its position on the celestial sphere, for the purpose of azimut observation. The fixed stars are devoid of either, wherefore, dip and refraction constitute the only elments for determining the moment, when these objects are situated in the true horizon. To an observer located from 20 to 30 feet above lake level, this happens when the object, be it planet or star, has an elevation of about 35 minutes of arc above the visible horizon, or a trifle higher than the diameter of the sun or moon.

To obtain the deviation of the compass from a bearing of a planet or fixed star at true rising or setting, the latitude, variation and declination of the object must be known.

Example 17. May 15, 1907, about 11 h. 30 m. p. m. Central Standard Time, when Port Dalhousie, Lake Ontario, bore south 3 miles distant, Pollux (b Geminorum) was observed to set N. 40° W. by compass, required the deviation?

The isogonic chart givs latitude 43¼°, variation 5.6° W., and from page 249 of the Nautical Almanac the declination of Pollux is found 28¼° N.

| | | |
|---|---|---|
| **Star's True Bearing**..... | N. 49.5° W. | **Table A.** |
| **Variation**..... | 5.6° W. | |
| **Stars Magnetic Bearing**... | N. 43.9° W. | |
| **Star's Bearing by Compass** | N. 40.0° W. | |
| **Deviation**..... | 3.9° W. | |

### Tables C and D, Pages 58-59.

These tables contain the time when the center of a celestial object passes the true horizon, the natural appearance of which has been described in the previous chapter. As may easily be noted by visual inspection, the quantities in each table for the same declination and latitude are supplemental to the other.

Table C embraces the time of true rising for objects, whose declination bears the same name as the latitude, and the time of true setting of objects, the declination of which is opposite to the latitude.

Table D contains the time of true setting for objects, whose declination has the same name as the latitude, and the time of true rising for objects with declination different from the latitude.

**To find the time of the true rising of the sun:** if the sun's declination is north, enter table C, at the intersection of the columns containing the latitude and declination, is found the Local Apparent Time A. M. desired; if his declination is south, table D furnishes the Local Apparent Time in the same manner.

**To obtain the time of true setting of the sun:** if the declination is north table **D** supplies the Local Apparent Time P. M. at the intersection of the columns containing the latitude and declination; if the declination is south, the Local Apparent Time P. M. for this phenomenon is acquired in table **C** in the same fashion.

If the Central Standard Time for these occurrences is required, the equation of time from the Nautical Almanac for the correct date, and the

correction for longitude from the isogonic chart, with its sign reversed, must be applied to the time taken from the tables.

I hope it is unnecessary to caution, that the time thus obtained is approximate, subject to the vagaries of terrestrial refraction, and other inaccuracies.

Example 18. August 6, 1907, off Point aux Barques, Lake Huron, required the Central Standard Time of true sunrise?

From isogonic map the latitude is 44°, correction for longitude 29 minutes (sign reversed) to subtract, the declination of the sun is 17° N. and the equation of time from page 128 of the Nautical Almanac is 6 minutes to add.

Entering table **C**, with the latitude and declination, the sunrise occurs at

| | | |
|---|---|---|
| | **4 h. 51 m.** | **a. m. Local Apparent Time.** |
| | **+ 6 m.** | **Equation of Time.** |
| | **4 h. 57 m.** | **a. m. Local Civil Time.** |
| | **— 29 m.** | **Correction for Longitude.** |
| **Sun Rises Aug. 6 ....** | **4 h. 28 m.** | **Central Standard Time.** |

### The Time of the True Rising and Setting of the Moon.

This phenomenon occurs as previously demonstrated, when the entire disk is yet below the visible horizon, therefore the approximate time when the upper limb of the moon meets the former, must necessarily be substituted. Owing to the moon's daily motion eastward, performing a sidereal revolution in 27.3 days, the upper transit, and consequently rising and setting are each day retarded about 51 minutes; the rapid change of the moon's declination in certain parts of her orbit, farther tends to create a difference in the rising and setting during each visible lunar day. For these reasons the computed time is liable to error, and should not be depended on within 10 minutes. The rising and setting of the moon does not constitute an important problem in navigation and is inserted merely for completeness.

Table VIII of the Nautical Almanac gives the Local Civil Time of Moonrise and Moonset for the Meridian of Greenwich. For an approximation for the Great Lakes it is merely necessary to enter the table using the date and latitude as arguments; and add 12 minutes to the time picked out. This method will suffice for use in gaining an approximate idea of the time the moon will be visible. It may be found more accurately by subtracting the time on the given date from the time on the following day and multiplying the difference by the twenty-fourth part of the longitude in hours and decimals of an hour. Apply the result as a correction to be added to the time obtained from the table for the given date.

Example 19. July 9, 1926, off Squaw Island, Lake Michigan, required the time of Moonrise and Moonset.

The isogonic map supplies latitude 46°, longitude about 5 hours 42 minutes west from Greenwich.

| | | | |
|---|---|---|---|
| **Table VIII Nautical Almanac supplies Time of Moonrise** | | **3 h. 48 m.** | **Moonset 19 h. 35 m.** |
| | **Add** | **12 m.** | **12 m.** |
| | | **4 h. 00 m.** | **19 h. 47 m.** |
| | | | **12 h.** |
| **Approximate Local Civil Time of Moonrise.....** | | **4 h. 00 m. A. M.** | **7 h. 47 m. P.M.** |
| **or more exactly:** | | | |

From Table VIII.

| | | |
|---|---|---|
| July 10 | Moonrise 4 h. 40 m. | Moonset 20 h. 21 m. |
| July 9 | Moonrise 3 h. 48 m. | Moonset 19 h. 35 m. |
| Difference..... | 52 m. | 46 m. |

$\frac{5.7 \times 52}{24} = 12.3$ m. 3 h. 48 m. plus 12 m. equals 4 h. 00 m. a. m. Local Civil Time of Moonrise.

$\frac{5.7 \times 46}{24} = 10.9$ m. 19 h. 35 m. plus 11 m. equals 19 h. 46 m. or 7 h. 46 m. p. m. Local Civil Time of Moonset.

### The Time of True Rising and Setting of the Planets and Fixed Stars.

This occurs as formerly stated, when the planet is elevated 35 minutes above the visible horizon. The following data are essential to obtain the time: meridian passage, and declination of the planet (or star) and latitude; the former elements are taken from the Nautical Almanac, the latter is taken from the isogonic chart. With latitude and declination of the planet (or star) enter table D if the declination is North, table C if South, the time where the columns containing these elements meet, equals the hour angle of the planet (or star) at true rising and setting, which, for the rising subtract from the meridian passage time, and to obtain the Local Civil Time of the setting add to the meridian passage time. If Central Standard Time is desired, apply the correction for longitude from isogonic chart with its sign reversed. 24 hours may be added or rejected in the computation to suit convenience.

Example 20. August 1, 1926, Point Aux Barques, Lake Huron, bearing W. 10 miles distant, required the approximate Central Standard Time of the true setting of Antares (Alpha Scorpii).

Latitude 44° correction for longitude is minus (sign reversed) 30 m. from isogonic chart. The Nautical Almanac supplies Antares Upper Transit as 19 h. 46 m., declination 26¼° S.

| | | |
|---|---|---|
| Antares Upper Transit..... | 19 h. 46 m. | (Nautical Almanac) |
| Antares Hour Angle..... | 4 h. 07 m. | (Table C) |
| Star's True Setting..... | 23 h. 53 m. | Local Civil Time. |
| | 12 h. | Subtract. |
| | 11 h. 53 m. | p. m. Local Civil Time. |
| | — 30 m. | Correction for Longitude. |
| Approximately | 11 h. 23 m. | p. m. Central Standard Time. |

### Table E. Page 60.

This table contains the approximate declination of the sun, to the tenth part of a degree, for every day of the year, it is sufficiently exact for ordinary purposes, and will be found to differ but slightly from the same elements in the American Nautical Almanac of future years.

The declination is designated N., when the sun is north of the celestial equator, S., when this object attains southerly declination, or is located south of the celestial equator. The former occupies the epoch from approximately March 21 to September 22, or 186 days of each year, the latter the remaining 179 days. No instructions for the use of the table are needed.

### Table F. Page 60.

This table embraces the approximate equation of time for every day of the year, it is applicable on local civil time, to obtain local apparent civil time, it is marked +, when it should be added, — when it must be subtracted. The table is self-explanatory. Table E and F were reduced from the Nautical Almanac.

### Table G. Page 61.

This table was condensed from the American Nautical Almanac and gives the true bearing of Polaris for the latitudes 40°, 45° and 50° for each hour of local Sidereal Time.

Due to the earths rotation Polaris apparently rotates in a small circle around the true pole. As the changes in azimut are small it is sufficiently accurate to take the Sidereal Time to the nearest hour, which is done by adding the Sidereal Time of 0 hour to the Local Civil Time.

Example 22. June 3, 1942, 10 P. M. CST, on Lake Huron, required the true bearing of Polaris.

| | |
|---|---|
| Central Standard Time | 10 00 PM |
| Convert to 0 - 24 hour series | 12 00 |
| Correction for longitude | + 25 |
| Local Civil Time | 22 25 |
| Sidereal time of Oh Civil time | 16 47 |
| | 39 12 |
| Subtract | 24 00 |
| Local Sidereal Time | 15 12 |

for which the azimut of Polaris from Table G is found to be North 0.6° East.

### Table H. Page 62.

This table contains the degrees and tenths, corresponding to every 8th of a point of the Mariners Compass, from 0° or North to 180° or South by East and West, and enables the observer to readily convert any azimut obtained from the tables into compass division, true or magnetic. This table is self explanatory.

### The Greek Alphabet. Page 63.

This contains the signs of the letters in the Greek Alphabet, and their pronunciation in English and is used to locate individual stars from the star map in the Nautical Almanac and vice versa.

## FORM FOR FINDING THE LOCAL SIDEREAL TIME AND LOCAL HOUR ANGLE WITH WHICH THE TABLES ARE TO BE ENTERED (GREAT LAKES AREA)

| | | |
|---|---|---|
| Standard Time, 0 to 24 hour series. (If necessary for next operation add 24 hours and subtract 1 day from date | | .....h. .....m. |
| Correction From Chart..... | + | .....h. .....m. |
| Local Civil Time (If greater than 24 hours, subtract 24 hours and add 1 day to date)..... | − | .....h. .....m. |
| Sidereal Time of 0 Hour GCT for above Date (Page 2 Nautical Almanac) ..... | + | .....h. .....m. |
| Correction From Table Below for Longitude and LCT | + | .....m. |
| Local Sidereal Time (Add 24 hours if necessary for next operation)..... | | .....h. .....m. |
| Right Ascention of Object Observed ..... | − | .....h. .....m. |
| Local Hour Angle (If greater than 24 hours subtract 24) | | .....h. .....m. |

If Local Hour Angle is less than 12 hours the object's bearing is named from North to West and the tables are entered in the P. M. column.

If Local Hour Angle is more than 12 hours the object's bearing is named from North to East. Subtract 12 hours and enter tables in the A. M. column.

### Correction for Longitude and Local Civil Time

(Great Lakes Area)

| LCT | LONGITUDE 75 | 80 | 85 | 90 |
|---|---|---|---|---|
| | m | m | m | m |
| 0 | 0.8 | 0.9 | 0.9 | 1.0 |
| 1 | 1.0 | 1.0 | 1.1 | 1.2 |
| 2 | 1.2 | 1.2 | 1.3 | 1.3 |
| 3 | 1.3 | 1.4 | 1.4 | 1.5 |
| 4 | 1.5 | 1.5 | 1.6 | 1.6 |
| 5 | 1.6 | 1.7 | 1.8 | 1.8 |
| 6 | 1.8 | 1.9 | 1.9 | 2.0 |
| 7 | 2.0 | 2.0 | 2.1 | 2.1 |
| 8 | 2.1 | 2.2 | 2.2 | 2.3 |
| 9 | 2.3 | 2.4 | 2.4 | 2.5 |
| 10 | 2.5 | 2.5 | 2.6 | 2.6 |
| 11 | 2.6 | 2.7 | 2.7 | 2.8 |
| 12 | 2.8 | 2.8 | 2.9 | 3.0 |

| LCT | LONGITUDE 75 | 80 | 85 | 90 |
|---|---|---|---|---|
| | m | m | m | m |
| 12 | 2.8 | 2.8 | 2.9 | 3.0 |
| 13 | 3.0 | 3.0 | 3.1 | 3.1 |
| 14 | 3.1 | 3.2 | 3.2 | 3.3 |
| 15 | 3.3 | 3.3 | 3.4 | 3.4 |
| 16 | 3.5 | 3.5 | 3.6 | 3.6 |
| 17 | 3.6 | 3.7 | 3.7 | 3.8 |
| 18 | 3.8 | 3.8 | 3.9 | 3.9 |
| 19 | 3.9 | 4.0 | 4.1 | 4.1 |
| 20 | 4.1 | 4.2 | 4.2 | 4.3 |
| 21 | 4.3 | 4.3 | 4.4 | 4.4 |
| 22 | 4.4 | 4.5 | 4.5 | 4.6 |
| 23 | 4.6 | 4.7 | 4.7 | 4.8 |
| 24 | 4.8 | 4.8 | 4.9 | 4.9 |

# PART I.

# AZIMUT OR TRUE BEARING.

| Time A.M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 178.7 | 178.7 | 178.6 | 178.6 | 178.6 | 178.6 | 178.5 | 178.5 | 178.5 | 178.5 | 178.4 | 178.4 | 178.4 | 178.3 | 178.3 | 49 | |
| | 48 | 178.7 | 178.6 | 178.6 | 178.6 | 178.6 | 178.5 | 178.5 | 178.5 | 178.5 | 178.4 | 178.4 | 178.4 | 178.3 | 178.3 | 178.3 | 48 | |
| | 47 | 178.6 | 178.6 | 178.6 | 178.6 | 178.5 | 178.5 | 178.5 | 178.5 | 178.4 | 178.4 | 178.4 | 178.3 | 178.3 | 178.3 | 178.2 | 47 | |
| | 46 | 178.6 | 178.6 | 178.6 | 178.5 | 178.5 | 178.5 | 178.5 | 178.4 | 178.4 | 178.4 | 178.3 | 178.3 | 178.3 | 178.2 | 178.2 | 46 | |
| 11-56 | 45 | 178.6 | 178.6 | 178.5 | 178.5 | 178.5 | 178.5 | 178.4 | 178.4 | 178.4 | 178.3 | 178.3 | 178.3 | 178.2 | 178.2 | 178.1 | 45 | 0-04 |
| | 44 | 178.6 | 178.5 | 178.5 | 178.5 | 178.5 | 178.4 | 178.4 | 178.4 | 178.3 | 178.3 | 178.2 | 178.2 | 178.2 | 178.1 | 178.1 | 44 | |
| | 43 | 178.5 | 178.5 | 178.5 | 178.5 | 178.4 | 178.4 | 178.4 | 178.3 | 178.3 | 178.2 | 178.2 | 178.2 | 178.1 | 178.1 | 178.0 | 43 | |
| | 42 | 178.5 | 178.5 | 178.5 | 178.4 | 178.4 | 178.3 | 178.3 | 178.3 | 178.2 | 178.2 | 178.1 | 178.1 | 178.0 | 178.0 | 177.9 | 42 | |
| | 41 | 178.5 | 178.4 | 178.4 | 178.4 | 178.3 | 178.3 | 178.3 | 178.3 | 178.2 | 178.1 | 178.1 | 178.0 | 178.0 | 177.9 | 177.9 | 41 | |
| | 49 | 177.3 | 177.3 | 177.3 | 177.2 | 177.2 | 177.1 | 177.1 | 177.0 | 177.0 | 176.9 | 176.9 | 176.8 | 176.8 | 176.7 | 176.6 | 49 | |
| | 48 | 177.3 | 177.3 | 177.2 | 177.2 | 177.1 | 177.1 | 177.0 | 177.0 | 176.9 | 176.9 | 176.8 | 176.7 | 176.7 | 176.6 | 176.5 | 48 | |
| | 47 | 177.3 | 177.2 | 177.2 | 177.1 | 177.1 | 177.0 | 177.0 | 176.9 | 176.9 | 176.8 | 176.7 | 176.7 | 176.6 | 176.5 | 176.5 | 47 | |
| | 46 | 177.2 | 177.2 | 177.1 | 177.1 | 177.0 | 177.0 | 176.9 | 176.8 | 176.8 | 176.7 | 176.7 | 176.6 | 176.5 | 176.4 | 176.4 | 46 | |
| 11-52 | 45 | 177.2 | 177.1 | 177.1 | 177.0 | 177.0 | 176.9 | 176.8 | 176.8 | 176.7 | 176.6 | 176.6 | 176.5 | 176.4 | 176.3 | 176.2 | 45 | 0-08 |
| | 44 | 177.1 | 177.1 | 177.0 | 177.0 | 176.9 | 176.8 | 176.8 | 176.7 | 176.6 | 176.6 | 176.5 | 176.4 | 176.3 | 176.2 | 176.1 | 44 | |
| | 43 | 177.1 | 177.0 | 177.0 | 176.9 | 176.8 | 176.8 | 176.7 | 176.6 | 176.6 | 176.5 | 176.4 | 176.3 | 176.2 | 176.1 | 176.0 | 43 | |
| | 42 | 177.0 | 177.0 | 176.9 | 176.8 | 176.8 | 176.7 | 176.6 | 176.5 | 176.5 | 176.4 | 176.3 | 176.2 | 176.1 | 176.0 | 175.9 | 42 | |
| | 41 | 177.0 | 176.9 | 176.8 | 176.8 | 176.7 | 176.6 | 176.5 | 176.5 | 176.4 | 176.3 | 176.2 | 176.1 | 176.0 | 175.9 | 175.7 | 41 | |
| | 49 | 176.0 | 176.0 | 175.9 | 175.8 | 175.8 | 175.7 | 175.6 | 175.6 | 175.5 | 175.4 | 175.3 | 175.2 | 175.1 | 175.0 | 174.9 | 49 | |
| | 48 | 176.0 | 175.9 | 175.8 | 175.8 | 175.7 | 175.6 | 175.6 | 175.5 | 175.4 | 175.3 | 175.2 | 175.1 | 175.0 | 174.9 | 174.8 | 48 | |
| | 47 | 175.9 | 175.8 | 175.8 | 175.7 | 175.6 | 175.6 | 175.5 | 175.4 | 175.3 | 175.2 | 175.1 | 175.0 | 174.9 | 174.8 | 174.7 | 47 | |
| | 46 | 175.8 | 175.8 | 175.7 | 175.6 | 175.5 | 175.5 | 175.4 | 175.3 | 175.2 | 175.1 | 175.0 | 174.9 | 174.8 | 174.7 | 174.5 | 46 | |
| 11-48 | 45 | 175.8 | 175.7 | 175.6 | 175.5 | 175.5 | 175.4 | 175.3 | 175.2 | 175.1 | 175.0 | 174.9 | 174.8 | 174.6 | 174.5 | 174.4 | 45 | 0-12 |
| | 44 | 175.7 | 175.6 | 175.5 | 175.4 | 175.4 | 175.3 | 175.2 | 175.1 | 175.0 | 174.9 | 174.7 | 174.6 | 174.5 | 174.3 | 174.2 | 44 | |
| | 43 | 175.6 | 175.5 | 175.4 | 175.4 | 175.3 | 175.2 | 175.1 | 174.9 | 174.8 | 174.7 | 174.6 | 174.5 | 174.3 | 174.2 | 174.0 | 43 | |
| | 42 | 175.5 | 175.4 | 175.4 | 175.3 | 175.2 | 175.0 | 174.9 | 174.8 | 174.7 | 174.6 | 174.4 | 174.3 | 174.1 | 174.0 | 173.8 | 42 | |
| | 41 | 175.4 | 175.3 | 175.2 | 175.1 | 175.0 | 174.9 | 174.8 | 174.7 | 174.6 | 174.4 | 174.3 | 174.1 | 174.0 | 173.8 | 173.6 | 41 | |
| | 49 | 174.7 | 174.6 | 174.5 | 174.5 | 174.4 | 174.3 | 174.2 | 174.1 | 174.0 | 173.9 | 173.8 | 173.6 | 173.5 | 173.4 | 173.3 | 49 | |
| | 48 | 174.6 | 174.5 | 174.5 | 174.4 | 174.3 | 174.2 | 174.1 | 174.0 | 173.9 | 173.7 | 173.6 | 173.5 | 173.4 | 173.2 | 173.1 | 48 | |
| | 47 | 174.5 | 174.5 | 174.4 | 174.3 | 174.2 | 174.1 | 174.0 | 173.8 | 173.7 | 173.6 | 173.5 | 173.3 | 173.2 | 173.1 | 172.9 | 47 | |
| | 46 | 174.5 | 174.4 | 174.3 | 174.2 | 174.1 | 173.9 | 173.8 | 173.7 | 173.6 | 173.5 | 173.3 | 173.2 | 173.0 | 172.9 | 172.7 | 46 | |
| 11-44 | 45 | 174.4 | 174.3 | 174.2 | 174.1 | 173.9 | 173.8 | 173.7 | 173.6 | 173.4 | 173.3 | 173.2 | 173.0 | 172.8 | 172.7 | 172.5 | 45 | 0-16 |
| | 44 | 174.3 | 174.1 | 174.0 | 173.9 | 173.8 | 173.7 | 173.6 | 173.4 | 173.3 | 173.1 | 173.0 | 172.8 | 172.6 | 172.5 | 172.3 | 44 | |
| | 43 | 174.1 | 174.0 | 173.9 | 173.8 | 173.7 | 173.5 | 173.4 | 173.3 | 173.1 | 173.0 | 172.8 | 172.6 | 172.4 | 172.2 | 172.0 | 43 | |
| | 42 | 174.0 | 173.9 | 173.8 | 173.7 | 173.5 | 173.4 | 173.3 | 173.1 | 172.9 | 172.8 | 172.6 | 172.4 | 172.2 | 172.0 | 171.8 | 42 | |
| | 41 | 173.9 | 173.8 | 173.7 | 173.5 | 173.4 | 173.3 | 173.1 | 172.9 | 172.8 | 172.6 | 172.4 | 172.2 | 172.0 | 171.7 | 171.5 | 41 | |
| | 49 | 173.4 | 173.3 | 173.2 | 173.1 | 173.0 | 172.8 | 172.7 | 172.6 | 172.5 | 172.3 | 172.2 | 172.1 | 171.9 | 171.7 | 171.6 | 49 | |
| | 48 | 173.3 | 173.2 | 173.1 | 173.0 | 172.8 | 172.7 | 172.6 | 172.5 | 172.3 | 172.2 | 172.0 | 171.9 | 171.7 | 171.5 | 171.4 | 48 | |
| | 47 | 173.2 | 173.1 | 173.0 | 172.8 | 172.7 | 172.6 | 172.5 | 172.3 | 172.2 | 172.0 | 171.9 | 171.7 | 171.5 | 171.3 | 171.1 | 47 | |
| | 46 | 173.1 | 173.0 | 172.8 | 172.7 | 172.6 | 172.4 | 172.3 | 172.1 | 172.0 | 171.8 | 171.7 | 171.5 | 171.3 | 171.1 | 170.9 | 46 | |
| 11-40 | 45 | 173.0 | 172.8 | 172.7 | 172.6 | 172.4 | 172.3 | 172.1 | 172.0 | 171.8 | 171.6 | 171.5 | 171.3 | 171.1 | 170.9 | 170.6 | 45 | 0-20 |
| | 44 | 172.8 | 172.7 | 172.6 | 172.4 | 172.3 | 172.1 | 172.0 | 171.8 | 171.6 | 171.4 | 171.2 | 171.0 | 170.8 | 170.6 | 170.4 | 44 | |
| | 43 | 172.7 | 172.6 | 172.4 | 172.3 | 172.1 | 171.9 | 171.8 | 171.6 | 171.4 | 171.2 | 171.0 | 170.8 | 170.6 | 170.3 | 170.0 | 43 | |
| | 42 | 172.6 | 172.4 | 172.3 | 172.1 | 171.9 | 171.8 | 171.6 | 171.4 | 171.2 | 171.0 | 170.8 | 170.5 | 170.3 | 170.0 | 169.7 | 42 | |
| | 41 | 172.4 | 172.3 | 172.1 | 171.9 | 171.8 | 171.6 | 171.4 | 171.2 | 171.0 | 170.7 | 170.5 | 170.2 | 170.0 | 169.7 | 169.4 | 41 | |
| | 49 | 172.1 | 172.0 | 171.8 | 171.7 | 171.6 | 171.4 | 171.3 | 171.1 | 171.0 | 170.8 | 170.7 | 170.5 | 170.3 | 170.1 | 169.9 | 49 | |
| | 48 | 172.0 | 171.8 | 171.7 | 171.6 | 171.4 | 171.3 | 171.1 | 171.0 | 170.8 | 170.6 | 170.5 | 170.3 | 170.1 | 169.9 | 169.7 | 48 | |
| | 47 | 171.8 | 171.7 | 171.6 | 171.4 | 171.3 | 171.1 | 170.9 | 170.8 | 170.6 | 170.4 | 170.2 | 170.0 | 169.8 | 169.6 | 169.4 | 47 | |
| | 46 | 171.7 | 171.6 | 171.4 | 171.3 | 171.1 | 170.9 | 170.8 | 170.6 | 170.4 | 170.2 | 170.0 | 169.8 | 169.6 | 169.4 | 169.1 | 46 | |
| 11-36 | 45 | 171.5 | 171.4 | 171.3 | 171.1 | 170.9 | 170.8 | 170.6 | 170.4 | 170.2 | 170.0 | 169.8 | 169.5 | 169.3 | 169.1 | 168.8 | 45 | 0-24 |
| | 44 | 171.4 | 171.2 | 171.1 | 170.9 | 170.7 | 170.6 | 170.4 | 170.2 | 170.0 | 169.7 | 169.5 | 169.3 | 169.0 | 168.7 | 168.4 | 44 | |
| | 43 | 171.2 | 171.1 | 170.9 | 170.7 | 170.5 | 170.3 | 170.1 | 169.9 | 169.7 | 169.5 | 169.2 | 169.0 | 168.7 | 168.4 | 168.1 | 43 | |
| | 42 | 171.1 | 170.9 | 170.7 | 170.5 | 170.3 | 170.1 | 169.9 | 169.7 | 169.4 | 169.2 | 168.9 | 168.7 | 168.4 | 168.1 | 167.7 | 42 | |
| | 41 | 170.9 | 170.7 | 170.5 | 170.3 | 170.1 | 169.9 | 169.7 | 169.4 | 169.2 | 168.9 | 168.6 | 168.3 | 168.0 | 167.7 | 167.3 | 41 | |
| | 49 | 170.8 | 170.6 | 170.5 | 170.3 | 170.2 | 170.0 | 169.8 | 169.7 | 169.5 | 169.3 | 169.1 | 168.9 | 168.7 | 168.5 | 168.2 | 49 | |
| | 48 | 170.6 | 170.5 | 170.3 | 170.2 | 170.0 | 169.8 | 169.7 | 169.5 | 169.3 | 169.1 | 168.9 | 168.7 | 168.4 | 168.2 | 168.0 | 48 | |
| | 47 | 170.5 | 170.3 | 170.2 | 170.0 | 169.8 | 169.6 | 169.5 | 169.3 | 169.1 | 168.9 | 168.6 | 168.4 | 168.2 | 167.9 | 167.6 | 47 | |
| | 46 | 170.3 | 170.2 | 170.0 | 169.8 | 169.6 | 169.4 | 169.2 | 169.0 | 168.8 | 168.6 | 168.4 | 168.1 | 167.9 | 167.6 | 167.3 | 46 | |
| 11-32 | 45 | 170.2 | 170.0 | 169.8 | 169.6 | 169.4 | 169.2 | 169.0 | 168.8 | 168.6 | 168.3 | 168.1 | 167.8 | 167.6 | 167.3 | 167.0 | 45 | 0-28 |
| | 44 | 170.0 | 169.8 | 169.6 | 169.4 | 169.2 | 169.0 | 168.8 | 168.5 | 168.3 | 168.1 | 167.8 | 167.5 | 167.2 | 166.9 | 166.6 | 44 | |
| | 43 | 169.8 | 169.6 | 169.4 | 169.2 | 169.0 | 168.8 | 168.5 | 168.3 | 168.0 | 167.8 | 167.5 | 167.2 | 166.9 | 166.5 | 166.2 | 43 | |
| | 42 | 169.6 | 169.4 | 169.2 | 169.0 | 168.7 | 168.5 | 168.3 | 168.0 | 167.7 | 167.4 | 167.1 | 166.8 | 166.5 | 166.1 | 165.7 | 42 | |
| | 41 | 169.4 | 169.2 | 169.0 | 168.7 | 168.5 | 168.2 | 168.0 | 167.7 | 167.4 | 167.1 | 166.8 | 166.4 | 166.1 | 165.7 | 165.3 | 41 | |
| | 49 | 169.5 | 169.3 | 169.1 | 169.0 | 168.8 | 168.6 | 168.4 | 168.2 | 168.0 | 167.8 | 167.6 | 167.4 | 167.1 | 166.9 | 166.6 | 49 | |
| | 48 | 169.3 | 169.1 | 169.0 | 168.8 | 168.6 | 168.4 | 168.2 | 168.0 | 167.7 | 167.6 | 167.3 | 167.1 | 166.8 | 166.6 | 166.3 | 48 | |
| | 47 | 169.1 | 169.0 | 168.8 | 168.6 | 168.4 | 168.2 | 168.0 | 167.7 | 167.5 | 167.3 | 167.0 | 166.8 | 166.5 | 166.2 | 165.9 | 47 | |
| | 46 | 169.0 | 168.8 | 168.6 | 168.4 | 168.2 | 168.0 | 167.7 | 167.5 | 167.3 | 167.0 | 166.7 | 166.5 | 166.2 | 165.9 | 165.5 | 46 | |
| 11-28 | 45 | 168.8 | 168.6 | 168.4 | 168.2 | 167.9 | 167.7 | 167.5 | 167.2 | 167.0 | 166.7 | 166.4 | 166.1 | 165.8 | 165.5 | 165.1 | 45 | 0-32 |
| | 44 | 168.6 | 168.4 | 168.2 | 167.9 | 167.7 | 167.5 | 167.2 | 166.9 | 166.7 | 166.4 | 166.1 | 165.8 | 165.4 | 165.1 | 164.7 | 44 | |
| | 43 | 168.4 | 168.1 | 167.9 | 167.7 | 167.4 | 167.2 | 166.9 | 166.6 | 166.3 | 166.0 | 165.7 | 165.4 | 165.0 | 164.7 | 164.2 | 43 | |
| | 42 | 168.1 | 167.9 | 167.7 | 167.4 | 167.2 | 166.9 | 166.6 | 166.3 | 166.0 | 165.7 | 165.3 | 165.0 | 164.6 | 164.2 | 163.7 | 42 | |
| | 41 | 167.9 | 167.7 | 167.4 | 167.2 | 166.9 | 166.6 | 166.3 | 166.0 | 165.6 | 165.3 | 164.9 | 164.5 | 164.1 | 163.7 | 163.2 | 41 | |
| | 49 | 168.2 | 168.0 | 167.8 | 167.6 | 167.4 | 167.2 | 167.0 | 166.8 | 166.5 | 166.3 | 166.1 | 165.8 | 165.5 | 165.3 | 165.0 | 49 | |
| | 48 | 168.0 | 167.8 | 167.6 | 167.4 | 167.2 | 167.0 | 166.8 | 166.5 | 166.3 | 166.0 | 165.8 | 165.5 | 165.2 | 164.9 | 164.6 | 48 | |
| | 47 | 167.8 | 167.6 | 167.4 | 167.2 | 167.0 | 166.7 | 166.5 | 166.2 | 166.0 | 165.7 | 165.4 | 165.1 | 164.8 | 164.5 | 164.2 | 47 | |
| | 46 | 167.6 | 167.4 | 167.2 | 167.0 | 166.7 | 166.5 | 166.2 | 166.0 | 165.7 | 165.4 | 165.1 | 164.8 | 164.5 | 164.1 | 163.8 | 46 | |
| 11-24 | 45 | 167.4 | 167.2 | 166.9 | 166.7 | 166.5 | 166.2 | 165.9 | 165.7 | 165.4 | 165.1 | 164.8 | 164.4 | 164.1 | 163.7 | 163.3 | 45 | 0-36 |
| | 44 | 167.2 | 166.9 | 166.7 | 166.4 | 166.2 | 165.9 | 165.6 | 165.3 | 165.0 | 164.7 | 164.4 | 164.0 | 163.7 | 163.3 | 162.8 | 44 | |
| | 43 | 166.9 | 166.7 | 166.4 | 166.2 | 165.9 | 165.6 | 165.3 | 165.0 | 164.7 | 164.3 | 164.0 | 163.6 | 163.2 | 162.8 | 162.3 | 43 | |
| | 42 | 166.7 | 166.4 | 166.2 | 165.9 | 165.6 | 165.3 | 165.0 | 164.6 | 164.3 | 163.9 | 163.6 | 163.2 | 162.7 | 162.3 | 161.8 | 42 | |
| | 41 | 166.4 | 166.2 | 165.9 | 165.6 | 165.3 | 165.0 | 164.6 | 164.3 | 163.9 | 163.5 | 163.1 | 162.7 | 162.2 | 161.7 | 161.2 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 178.3 | 178.2 | 178.2 | 178.2 | 178.1 | 178.1 | 178.0 | 178.0 | 177.9 | 177.8 | 177.8 | 177.7 | 177.6 | 177.5 | 177.4 | 49 | |
| | 48 | 178.2 | 178.2 | 178.1 | 178.1 | 178.1 | 178.0 | 177.9 | 177.9 | 177.8 | 177.8 | 177.7 | 177.6 | 177.5 | 177.4 | 177.3 | 48 | |
| | 47 | 178.2 | 178.1 | 178.1 | 178.0 | 178.0 | 177.9 | 177.9 | 177.8 | 177.7 | 177.7 | 177.6 | 177.5 | 177.4 | 177.3 | 177.2 | 47 | |
| | 46 | 178.1 | 178.1 | 178.0 | 178.0 | 177.9 | 177.9 | 177.8 | 177.7 | 177.6 | 177.6 | 177.5 | 177.4 | 177.3 | 177.1 | 177.0 | 46 | |
| 11-56 | 45 | 178.1 | 178.0 | 178.0 | 177.9 | 177.8 | 177.8 | 177.7 | 177.6 | 177.5 | 177.5 | 177.4 | 177.2 | 177.1 | 177.0 | 176.8 | 45 | 0-04 |
| | 44 | 178.0 | 178.0 | 177.9 | 177.8 | 177.8 | 177.7 | 177.6 | 177.5 | 177.4 | 177.3 | 177.2 | 177.1 | 177.0 | 176.8 | 176.6 | 44 | |
| | 43 | 177.9 | 177.9 | 177.8 | 177.8 | 177.7 | 177.6 | 177.5 | 177.4 | 177.3 | 177.2 | 177.1 | 176.9 | 176.8 | 176.6 | 176.4 | 43 | |
| | 42 | 177.9 | 177.8 | 177.7 | 177.7 | 177.6 | 177.5 | 177.4 | 177.3 | 177.2 | 177.0 | 176.9 | 176.7 | 176.6 | 176.4 | 176.1 | 42 | |
| | 41 | 177.8 | 177.7 | 177.7 | 177.6 | 177.5 | 177.4 | 177.3 | 177.2 | 177.0 | 176.9 | 176.7 | 176.5 | 176.3 | 176.1 | 175.8 | 41 | |
| | 49 | 176.5 | 176.5 | 176.4 | 176.3 | 176.2 | 176.1 | 176.0 | 175.9 | 175.8 | 175.7 | 175.5 | 175.4 | 175.2 | 175.1 | 174.9 | 49 | |
| | 48 | 176.5 | 176.4 | 176.3 | 176.2 | 176.1 | 176.0 | 175.9 | 175.8 | 175.6 | 175.5 | 175.4 | 175.2 | 175.0 | 174.8 | 174.6 | 48 | |
| | 47 | 176.4 | 176.3 | 176.2 | 176.1 | 176.0 | 175.9 | 175.7 | 175.6 | 175.5 | 175.3 | 175.2 | 175.0 | 174.8 | 174.6 | 174.4 | 47 | |
| | 46 | 176.3 | 176.2 | 176.1 | 176.0 | 175.8 | 175.7 | 175.6 | 175.5 | 175.3 | 175.1 | 175.0 | 174.8 | 174.5 | 174.3 | 174.0 | 46 | |
| 11-52 | 45 | 176.1 | 176.0 | 175.9 | 175.3 | 175.7 | 175.6 | 175.4 | 175.3 | 175.1 | 174.9 | 174.7 | 174.5 | 174.2 | 174.0 | 173.7 | 45 | 0-08 |
| | 44 | 176.0 | 175.9 | 175.8 | 175.7 | 175.5 | 175.4 | 175.2 | 175.1 | 174.9 | 174.7 | 174.4 | 174.2 | 173.9 | 173.6 | 173.3 | 44 | |
| | 43 | 175.9 | 175.8 | 175.6 | 175.5 | 175.3 | 175.2 | 175.0 | 174.8 | 174.6 | 174.4 | 174.1 | 173.9 | 173.6 | 173.2 | 172.8 | 43 | |
| | 42 | 175.8 | 175.6 | 175.5 | 175.3 | 175.2 | 175.0 | 174.8 | 174.6 | 174.4 | 174.1 | 173.8 | 173.5 | 173.1 | 172.7 | 172.3 | 42 | |
| | 41 | 175.6 | 175.5 | 175.3 | 175.2 | 175.0 | 174.8 | 174.6 | 174.3 | 174.1 | 173.8 | 173.4 | 173.1 | 172.7 | 172.2 | 171.6 | 41 | |
| | 49 | 174.8 | 174.7 | 174.6 | 174.5 | 174.4 | 174.2 | 174.0 | 173.9 | 173.7 | 173.5 | 173.3 | 173.1 | 172.9 | 172.6 | 172.4 | 49 | |
| | 48 | 174.7 | 174.6 | 174.4 | 174.3 | 174.1 | 174.0 | 173.8 | 173.7 | 173.5 | 173.3 | 173.1 | 172.8 | 172.6 | 172.3 | 172.0 | 48 | |
| | 47 | 174.6 | 174.4 | 174.3 | 174.1 | 174.0 | 173.8 | 173.6 | 173.4 | 173.2 | 173.0 | 172.8 | 172.5 | 172.2 | 171.9 | 171.6 | 47 | |
| | 46 | 174.4 | 174.3 | 174.1 | 173.9 | 173.8 | 173.6 | 173.4 | 173.2 | 173.0 | 172.7 | 172.4 | 172.1 | 171.8 | 171.5 | 171.1 | 46 | |
| 11-48 | 45 | 174.2 | 174.1 | 173.9 | 173.7 | 173.5 | 173.3 | 173.1 | 172.9 | 172.7 | 172.4 | 172.1 | 171.8 | 171.4 | 171.0 | 170.5 | 45 | 0-12 |
| | 44 | 174.0 | 173.9 | 173.7 | 173.5 | 173.3 | 173.1 | 172.9 | 172.6 | 172.3 | 172.0 | 171.7 | 171.3 | 170.9 | 170.5 | 169.9 | 44 | |
| | 43 | 173.8 | 173.7 | 173.5 | 173.3 | 173.0 | 172.8 | 172.6 | 172.3 | 171.9 | 171.6 | 171.2 | 170.8 | 170.4 | 169.8 | 169.3 | 43 | |
| | 42 | 173.6 | 173.4 | 173.2 | 173.0 | 172.8 | 172.5 | 172.2 | 171.9 | 171.6 | 171.2 | 170.8 | 170.3 | 169.8 | 169.2 | 168.5 | 42 | |
| | 41 | 173.4 | 173.2 | 173.0 | 172.7 | 172.5 | 172.2 | 171.9 | 171.5 | 171.1 | 170.7 | 170.2 | 169.7 | 169.1 | 168.4 | 167.5 | 41 | |
| | 49 | 173.1 | 173.0 | 172.8 | 172.6 | 172.5 | 172.3 | 172.1 | 171.9 | 171.6 | 171.4 | 171.1 | 170.8 | 170.5 | 170.2 | 169.8 | 49 | |
| | 48 | 172.9 | 172.8 | 172.6 | 172.4 | 172.2 | 172.0 | 171.8 | 171.6 | 171.3 | 171.1 | 170.8 | 170.5 | 170.1 | 169.7 | 169.3 | 48 | |
| | 47 | 172.7 | 172.6 | 172.4 | 172.2 | 172.0 | 171.8 | 171.5 | 171.3 | 171.0 | 170.7 | 170.4 | 170.0 | 169.7 | 169.2 | 168.8 | 47 | |
| | 46 | 172.5 | 172.3 | 172.1 | 171.9 | 171.7 | 171.5 | 171.2 | 170.9 | 170.6 | 170.3 | 170.0 | 169.6 | 169.1 | 168.7 | 168.2 | 46 | |
| 11-44 | 45 | 172.3 | 172.1 | 171.9 | 171.7 | 171.4 | 171.2 | 170.9 | 170.6 | 170.2 | 169.9 | 169.5 | 169.0 | 168.6 | 168.0 | 167.5 | 45 | 0-16 |
| | 44 | 172.0 | 171.8 | 171.6 | 171.4 | 171.1 | 170.8 | 170.5 | 170.2 | 169.8 | 169.4 | 169.0 | 168.5 | 167.9 | 167.3 | 166.7 | 44 | |
| | 43 | 171.8 | 171.6 | 171.3 | 171.0 | 170.7 | 170.4 | 170.1 | 169.7 | 169.3 | 168.9 | 168.4 | 167.8 | 167.2 | 166.5 | 165.8 | 43 | |
| | 42 | 171.5 | 171.3 | 171.0 | 170.7 | 170.4 | 170.0 | 169.7 | 169.2 | 168.8 | 168.3 | 167.7 | 167.1 | 166.4 | 165.6 | 164.7 | 42 | |
| | 41 | 171.2 | 171.0 | 170.7 | 170.3 | 170.0 | 169.6 | 169.2 | 168.7 | 168.2 | 167.6 | 167.0 | 166.3 | 165.5 | 164.6 | 163.5 | 41 | |
| | 49 | 171.4 | 171.2 | 171.0 | 170.8 | 170.6 | 170.4 | 170.1 | 169.9 | 169.6 | 169.3 | 169.0 | 168.6 | 168.2 | 167.8 | 167.4 | 49 | |
| | 48 | 171.2 | 171.0 | 170.8 | 170.5 | 170.3 | 170.1 | 169.8 | 169.5 | 169.2 | 168.9 | 168.5 | 168.1 | 167.7 | 167.2 | 166.7 | 48 | |
| | 47 | 170.9 | 170.7 | 170.5 | 170.3 | 170.0 | 169.7 | 169.4 | 169.1 | 168.8 | 168.4 | 168.0 | 167.6 | 167.1 | 166.6 | 166.1 | 47 | |
| | 46 | 170.7 | 170.4 | 170.2 | 169.9 | 169.7 | 169.4 | 169.0 | 168.7 | 168.3 | 167.9 | 167.5 | 167.0 | 166.5 | 165.9 | 165.3 | 46 | |
| 11-40 | 45 | 170.4 | 170.2 | 169.9 | 169.6 | 169.3 | 169.0 | 168.6 | 168.2 | 167.8 | 167.4 | 166.9 | 166.4 | 165.8 | 165.2 | 164.4 | 45 | 0-20 |
| | 44 | 170.1 | 169.8 | 169.5 | 169.2 | 168.9 | 168.5 | 168.2 | 167.7 | 167.3 | 166.8 | 166.3 | 165.7 | 165.0 | 164.3 | 163.5 | 44 | |
| | 43 | 169.8 | 169.5 | 169.2 | 168.8 | 168.5 | 168.1 | 167.7 | 167.2 | 166.7 | 166.1 | 165.5 | 164.9 | 164.1 | 163.3 | 162.4 | 43 | |
| | 42 | 169.4 | 169.1 | 168.8 | 168.4 | 168.0 | 167.6 | 167.1 | 166.6 | 166.1 | 165.4 | 164.8 | 164.0 | 163.2 | 162.2 | 161.1 | 42 | |
| | 41 | 169.1 | 168.7 | 168.4 | 168.0 | 167.5 | 167.1 | 166.5 | 166.0 | 165.3 | 164.7 | 163.9 | 163.0 | 162.0 | 160.9 | 159.7 | 41 | |
| | 49 | 169.7 | 169.5 | 169.3 | 169.0 | 168.7 | 168.5 | 168.2 | 167.8 | 167.5 | 167.2 | 166.8 | 166.4 | 165.9 | 165.4 | 164.9 | 49 | |
| | 48 | 169.4 | 169.2 | 168.9 | 168.7 | 168.4 | 168.1 | 167.8 | 167.4 | 167.1 | 166.7 | 166.2 | 165.8 | 165.3 | 164.7 | 164.1 | 48 | |
| | 47 | 169.1 | 168.9 | 168.6 | 168.3 | 168.0 | 167.7 | 167.3 | 167.0 | 166.6 | 166.1 | 165.7 | 165.2 | 164.6 | 164.0 | 163.3 | 47 | |
| | 46 | 168.8 | 168.6 | 168.3 | 167.9 | 167.6 | 167.3 | 166.9 | 166.5 | 166.0 | 165.6 | 165.1 | 164.5 | 163.9 | 163.2 | 162.4 | 46 | |
| 11-36 | 45 | 168.5 | 168.2 | 167.9 | 167.6 | 167.2 | 166.8 | 166.4 | 165.9 | 165.5 | 164.9 | 164.4 | 163.7 | 163.0 | 162.3 | 161.4 | 45 | 0-24 |
| | 44 | 168.1 | 167.8 | 167.5 | 167.1 | 166.7 | 166.3 | 165.9 | 165.4 | 164.8 | 164.2 | 163.6 | 162.9 | 162.1 | 161.3 | 160.3 | 44 | |
| | 43 | 167.8 | 167.4 | 167.1 | 166.7 | 166.2 | 165.8 | 165.3 | 164.7 | 164.1 | 163.5 | 162.8 | 162.0 | 161.1 | 160.1 | 159.0 | 43 | |
| | 42 | 167.4 | 167.0 | 166.6 | 166.2 | 165.7 | 165.2 | 164.6 | 164.0 | 163.4 | 162.7 | 161.9 | 161.0 | 160.0 | 158.9 | 157.6 | 42 | |
| | 41 | 166.9 | 166.5 | 166.1 | 165.6 | 165.1 | 164.5 | 163.9 | 163.3 | 162.5 | 161.7 | 160.8 | 159.8 | 158.7 | 157.4 | 155.9 | 41 | |
| | 49 | 168.0 | 167.7 | 167.5 | 167.2 | 166.9 | 166.6 | 166.2 | 165.9 | 165.5 | 165.1 | 164.6 | 164.1 | 163.6 | 163.1 | 162.5 | 49 | |
| | 48 | 167.7 | 167.4 | 167.1 | 166.8 | 166.5 | 166.2 | 165.8 | 165.4 | 165.0 | 164.5 | 164.0 | 163.5 | 162.9 | 162.3 | 161.6 | 48 | |
| | 47 | 167.4 | 167.1 | 166.8 | 166.4 | 166.1 | 165.7 | 165.3 | 164.9 | 164.4 | 163.9 | 163.4 | 162.8 | 162.1 | 161.5 | 160.7 | 47 | |
| | 46 | 167.0 | 166.7 | 166.3 | 166.0 | 165.6 | 165.2 | 164.8 | 164.3 | 163.8 | 163.2 | 162.6 | 162.0 | 161.3 | 160.5 | 159.7 | 46 | |
| 11-32 | 45 | 166.6 | 166.3 | 165.9 | 165.5 | 165.1 | 164.7 | 164.2 | 163.7 | 163.1 | 162.5 | 161.9 | 161.1 | 160.4 | 159.5 | 158.5 | 45 | 0-28 |
| | 44 | 166.2 | 165.8 | 165.4 | 165.0 | 164.6 | 164.1 | 163.6 | 163.0 | 162.4 | 161.7 | 161.0 | 160.2 | 159.3 | 158.3 | 157.3 | 44 | |
| | 43 | 165.8 | 165.4 | 165.0 | 164.5 | 164.0 | 163.5 | 162.9 | 162.3 | 161.6 | 160.9 | 160.1 | 159.2 | 158.2 | 157.1 | 155.8 | 43 | |
| | 42 | 165.3 | 164.9 | 164.4 | 163.9 | 163.4 | 162.8 | 162.2 | 161.5 | 160.7 | 159.9 | 159.0 | 158.0 | 156.9 | 155.6 | 154.2 | 42 | |
| | 41 | 164.8 | 164.3 | 163.8 | 163.3 | 162.7 | 162.1 | 161.4 | 160.6 | 159.8 | 158.9 | 157.8 | 156.7 | 155.4 | 154.0 | 152.4 | 41 | |
| | 49 | 166.3 | 166.0 | 165.7 | 165.4 | 165.1 | 164.7 | 164.3 | 163.9 | 163.5 | 163.0 | 162.5 | 162.0 | 161.4 | 160.8 | 160.1 | 49 | |
| | 48 | 166.0 | 165.7 | 165.3 | 165.0 | 164.6 | 164.2 | 163.8 | 163.4 | 163.0 | 162.4 | 161.8 | 161.2 | 160.6 | 159.9 | 159.1 | 48 | |
| | 47 | 165.6 | 165.3 | 164.9 | 164.5 | 164.1 | 163.7 | 163.3 | 162.8 | 162.2 | 161.7 | 161.1 | 160.4 | 159.7 | 158.9 | 158.1 | 47 | |
| | 46 | 165.2 | 164.8 | 164.4 | 164.0 | 163.6 | 163.1 | 162.7 | 162.1 | 161.6 | 161.0 | 160.3 | 159.6 | 158.8 | 157.9 | 157.0 | 46 | |
| 11-28 | 45 | 164.8 | 164.4 | 164.0 | 163.5 | 163.1 | 162.6 | 162.0 | 161.4 | 160.8 | 160.1 | 159.4 | 158.6 | 157.7 | 156.8 | 155.7 | 45 | 0-32 |
| | 44 | 164.3 | 163.9 | 163.5 | 163.0 | 162.5 | 161.9 | 161.3 | 160.7 | 160.0 | 159.3 | 158.5 | 157.6 | 156.6 | 155.5 | 154.3 | 44 | |
| | 43 | 163.8 | 163.4 | 162.9 | 162.4 | 161.8 | 161.2 | 160.6 | 159.9 | 159.1 | 158.3 | 157.4 | 156.4 | 155.3 | 154.1 | 152.7 | 43 | |
| | 42 | 163.3 | 162.8 | 162.3 | 161.7 | 161.1 | 160.5 | 159.8 | 159.0 | 158.2 | 157.2 | 156.2 | 155.1 | 153.9 | 152.5 | 151.0 | 42 | |
| | 41 | 162.7 | 162.2 | 161.6 | 161.0 | 160.4 | 159.6 | 158.9 | 158.0 | 157.1 | 156.1 | 154.9 | 153.7 | 152.3 | 150.7 | 149.0 | 41 | |
| | 49 | 164.6 | 164.3 | 164.0 | 163.6 | 163.3 | 162.8 | 162.4 | 162.0 | 161.5 | 161.0 | 160.4 | 159.8 | 159.2 | 158.5 | 157.7 | 49 | |
| | 48 | 164.3 | 163.9 | 163.5 | 163.2 | 162.7 | 162.3 | 161.9 | 161.4 | 160.8 | 160.3 | 159.7 | 159.0 | 158.3 | 157.5 | 156.7 | 48 | |
| | 47 | 163.8 | 163.5 | 163.1 | 162.6 | 162.2 | 161.7 | 161.2 | 160.7 | 160.1 | 159.5 | 158.8 | 158.1 | 157.3 | 156.5 | 155.6 | 47 | |
| | 46 | 163.4 | 163.0 | 162.5 | 162.1 | 161.6 | 161.1 | 160.6 | 160.0 | 159.4 | 158.7 | 158.0 | 157.2 | 156.3 | 155.4 | 154.3 | 46 | |
| 11-24 | 45 | 162.9 | 162.5 | 162.0 | 161.5 | 161.0 | 160.5 | 159.9 | 159.2 | 158.6 | 157.8 | 157.0 | 156.1 | 155.2 | 154.1 | 153.0 | 45 | 0-36 |
| | 44 | 162.4 | 161.9 | 161.5 | 160.9 | 160.4 | 159.8 | 159.1 | 158.4 | 157.7 | 156.8 | 156.0 | 155.0 | 153.9 | 152.7 | 151.4 | 44 | |
| | 43 | 161.9 | 161.4 | 160.8 | 160.3 | 159.6 | 159.0 | 158.3 | 157.5 | 156.7 | 155.8 | 154.8 | 153.7 | 152.5 | 151.2 | 149.7 | 43 | |
| | 42 | 161.3 | 160.7 | 160.2 | 159.5 | 158.9 | 158.2 | 157.4 | 156.6 | 155.6 | 154.6 | 153.5 | 152.3 | 151.0 | 149.5 | 147.9 | 42 | |
| | 41 | 160.7 | 160.1 | 159.4 | 158.8 | 158.0 | 157.3 | 156.4 | 155.5 | 154.5 | 153.4 | 152.1 | 150.8 | 149.3 | 147.6 | 145.7 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 168.2 | 168.0 | 167.8 | 167.6 | 167.4 | 167.2 | 167.0 | 166.8 | 166.5 | 166.3 | 166.1 | 165.8 | 165.5 | 165.3 | 165.0 | 49 | |
| | 48 | 168.0 | 167.8 | 167.6 | 167.4 | 167.2 | 167.0 | 166.8 | 166.5 | 166.3 | 166.0 | 165.8 | 165.5 | 165.2 | 164.9 | 164.6 | 48 | |
| | 47 | 167.8 | 167.6 | 167.4 | 167.2 | 167.0 | 166.7 | 166.5 | 166.2 | 166.0 | 165.7 | 165.4 | 165.1 | 164.8 | 164.5 | 164.2 | 47 | |
| | 46 | 167.6 | 167.4 | 167.2 | 167.0 | 166.7 | 166.5 | 166.2 | 166.0 | 165.7 | 165.4 | 165.1 | 164.8 | 164.5 | 164.1 | 163.8 | 46 | |
| 11-24 | 45 | 167.4 | 167.2 | 166.9 | 166.7 | 166.5 | 166.2 | 165.9 | 165.7 | 165.4 | 165.1 | 164.8 | 164.4 | 164.1 | 163.7 | 163.3 | 45 | 0-36 |
| | 44 | 167.2 | 166.9 | 166.7 | 166.4 | 166.2 | 165.9 | 165.5 | 165.3 | 165.0 | 164.7 | 164.4 | 164.0 | 163.7 | 163.3 | 162.8 | 44 | |
| | 43 | 166.9 | 166.7 | 166.4 | 166.2 | 165.9 | 165.6 | 165.3 | 165.0 | 164.7 | 164.3 | 164.0 | 163.6 | 163.2 | 162.8 | 162.3 | 43 | |
| | 42 | 166.7 | 166.4 | 166.2 | 165.9 | 165.6 | 165.3 | 165.0 | 164.6 | 164.3 | 163.9 | 163.6 | 163.2 | 162.7 | 162.3 | 161.8 | 42 | |
| | 41 | 166.4 | 166.2 | 165.9 | 165.6 | 165.3 | 165.0 | 164.6 | 164.3 | 163.9 | 163.5 | 163.1 | 162.7 | 162.2 | 161.7 | 161.2 | 41 | |
| | 49 | 166.9 | 166.7 | 166.5 | 166.2 | 166.0 | 165.8 | 165.6 | 165.3 | 165.1 | 164.8 | 164.5 | 164.3 | 164.0 | 163.7 | 163.3 | 49 | |
| | 48 | 166.7 | 166.5 | 166.2 | 166.0 | 165.8 | 165.5 | 165.3 | 165.0 | 164.8 | 164.5 | 164.2 | 163.9 | 163.6 | 163.3 | 162.9 | 48 | |
| | 47 | 166.5 | 166.2 | 166.0 | 165.8 | 165.5 | 165.3 | 165.0 | 164.7 | 164.5 | 164.2 | 163.9 | 163.5 | 163.2 | 162.9 | 162.5 | 47 | |
| | 46 | 166.2 | 166.0 | 165.8 | 165.5 | 165.3 | 165.0 | 164.7 | 164.4 | 164.1 | 163.8 | 163.5 | 163.2 | 162.8 | 162.4 | 162.0 | 46 | |
| 11-20 | 45 | 166.0 | 165.8 | 165.5 | 165.3 | 165.0 | 164.7 | 164.4 | 164.1 | 163.8 | 163.5 | 163.1 | 162.7 | 162.4 | 162.0 | 161.5 | 45 | 0-40 |
| | 44 | 165.8 | 165.5 | 165.2 | 165.0 | 164.7 | 164.4 | 164.1 | 163.8 | 163.4 | 163.1 | 162.7 | 162.3 | 161.9 | 161.5 | 161.0 | 44 | |
| | 43 | 165.5 | 165.2 | 165.0 | 164.7 | 164.4 | 164.1 | 163.7 | 163.4 | 163.0 | 162.7 | 162.3 | 161.9 | 161.4 | 161.0 | 160.5 | 43 | |
| | 42 | 165.2 | 165.0 | 164.7 | 164.4 | 164.0 | 163.7 | 163.4 | 163.0 | 162.6 | 162.2 | 161.8 | 161.4 | 160.9 | 160.4 | 159.9 | 42 | |
| | 41 | 165.0 | 164.7 | 164.4 | 164.0 | 163.7 | 163.3 | 163.0 | 162.6 | 162.2 | 161.8 | 161.3 | 160.8 | 160.3 | 159.8 | 159.2 | 41 | |
| | 49 | 165.6 | 165.3 | 165.1 | 164.9 | 164.7 | 164.4 | 164.2 | 163.9 | 163.6 | 163.3 | 163.0 | 162.7 | 162.4 | 162.1 | 161.7 | 49 | |
| | 48 | 165.3 | 165.1 | 164.9 | 164.7 | 164.4 | 164.1 | 163.9 | 163.6 | 163.3 | 163.0 | 162.7 | 162.4 | 162.0 | 161.7 | 161.3 | 48 | |
| | 47 | 165.1 | 164.9 | 164.6 | 164.4 | 164.1 | 163.8 | 163.6 | 163.3 | 163.0 | 162.6 | 162.3 | 162.0 | 161.6 | 161.2 | 160.8 | 47 | |
| | 46 | 164.9 | 164.6 | 164.4 | 164.1 | 163.8 | 163.5 | 163.2 | 162.9 | 162.6 | 162.3 | 161.9 | 161.6 | 161.2 | 160.7 | 160.3 | 46 | |
| 11-16 | 45 | 164.7 | 164.4 | 164.1 | 163.8 | 163.5 | 163.2 | 162.9 | 162.6 | 162.2 | 161.9 | 161.5 | 161.1 | 160.7 | 160.2 | 159.8 | 45 | 0-44 |
| | 44 | 164.4 | 164.1 | 163.8 | 163.5 | 163.2 | 162.9 | 162.5 | 162.2 | 161.8 | 161.4 | 161.1 | 160.6 | 160.2 | 159.7 | 159.2 | 44 | |
| | 43 | 164.1 | 163.8 | 163.5 | 163.2 | 162.9 | 162.5 | 162.2 | 161.8 | 161.4 | 161.0 | 160.6 | 160.1 | 159.6 | 159.1 | 158.6 | 43 | |
| | 42 | 163.8 | 163.5 | 163.2 | 162.8 | 162.5 | 162.1 | 161.8 | 161.4 | 160.9 | 160.5 | 160.1 | 159.6 | 159.1 | 158.5 | 158.0 | 42 | |
| | 41 | 163.5 | 163.2 | 162.8 | 162.5 | 162.1 | 161.7 | 161.3 | 160.9 | 160.5 | 160.0 | 159.5 | 159.0 | 158.5 | 157.9 | 157.3 | 41 | |
| | 49 | 164.3 | 164.0 | 163.8 | 163.6 | 163.3 | 163.0 | 162.8 | 162.5 | 162.2 | 161.9 | 161.5 | 161.2 | 160.9 | 160.5 | 160.1 | 49 | |
| | 48 | 164.0 | 163.8 | 163.6 | 163.3 | 163.0 | 162.7 | 162.4 | 162.1 | 161.8 | 161.5 | 161.2 | 160.8 | 160.4 | 160.0 | 159.6 | 48 | |
| | 47 | 163.8 | 163.6 | 163.3 | 163.0 | 162.7 | 162.4 | 162.1 | 161.8 | 161.5 | 161.1 | 160.8 | 160.4 | 160.0 | 159.6 | 159.1 | 47 | |
| | 46 | 163.6 | 163.3 | 163.0 | 162.7 | 162.4 | 162.1 | 161.8 | 161.4 | 161.1 | 160.7 | 160.3 | 160.0 | 159.5 | 159.1 | 158.6 | 46 | |
| 11-12 | 45 | 163.3 | 163.0 | 162.7 | 162.4 | 162.1 | 161.7 | 161.4 | 161.0 | 160.7 | 160.3 | 159.9 | 159.4 | 159.0 | 158.5 | 158.0 | 45 | 0-48 |
| | 44 | 163.0 | 162.7 | 162.4 | 162.1 | 161.7 | 161.4 | 161.0 | 160.6 | 160.2 | 159.8 | 159.4 | 158.9 | 158.5 | 158.0 | 157.4 | 44 | |
| | 43 | 162.7 | 162.4 | 162.1 | 161.7 | 161.4 | 161.0 | 160.6 | 160.2 | 159.8 | 159.3 | 158.9 | 158.4 | 157.9 | 157.4 | 156.8 | 43 | |
| | 42 | 162.4 | 162.1 | 161.7 | 161.3 | 161.0 | 160.6 | 160.2 | 159.7 | 159.3 | 158.8 | 158.3 | 157.8 | 157.3 | 156.7 | 156.1 | 42 | |
| | 41 | 162.1 | 161.7 | 161.3 | 161.0 | 160.6 | 160.2 | 159.7 | 159.3 | 158.8 | 158.3 | 157.8 | 157.2 | 156.6 | 156.0 | 155.4 | 41 | |
| | 49 | 163.0 | 162.7 | 162.5 | 162.2 | 162.0 | 161.7 | 161.4 | 161.0 | 160.7 | 160.4 | 160.1 | 159.7 | 159.3 | 158.9 | 158.5 | 49 | |
| | 48 | 162.7 | 162.5 | 162.2 | 161.9 | 161.6 | 161.3 | 161.0 | 160.7 | 160.4 | 160.0 | 159.7 | 159.3 | 158.9 | 158.5 | 158.0 | 48 | |
| | 47 | 162.5 | 162.2 | 161.9 | 161.6 | 161.3 | 161.0 | 160.7 | 160.3 | 160.0 | 159.6 | 159.2 | 158.8 | 158.4 | 157.9 | 157.5 | 47 | |
| | 46 | 162.2 | 161.9 | 161.6 | 161.3 | 161.0 | 160.7 | 160.3 | 160.0 | 159.6 | 159.2 | 158.8 | 158.4 | 157.9 | 157.4 | 156.9 | 46 | |
| 11-08 | 45 | 161.9 | 161.6 | 161.3 | 161.0 | 160.6 | 160.3 | 159.9 | 159.5 | 159.1 | 158.7 | 158.3 | 157.8 | 157.3 | 156.8 | 156.3 | 45 | 0-52 |
| | 44 | 161.6 | 161.3 | 161.0 | 160.6 | 160.2 | 159.9 | 159.5 | 159.1 | 158.7 | 158.2 | 157.8 | 157.3 | 156.8 | 156.2 | 155.7 | 44 | |
| | 43 | 161.3 | 161.0 | 160.6 | 160.2 | 159.9 | 159.5 | 159.1 | 158.6 | 158.2 | 157.7 | 157.2 | 156.7 | 156.2 | 155.6 | 155.0 | 43 | |
| | 42 | 161.0 | 160.6 | 160.2 | 159.9 | 159.4 | 159.0 | 158.6 | 158.1 | 157.7 | 157.2 | 156.6 | 156.1 | 155.5 | 154.9 | 154.3 | 42 | |
| | 41 | 160.6 | 160.3 | 159.9 | 159.4 | 159.0 | 158.6 | 158.1 | 157.6 | 157.1 | 156.6 | 156.0 | 155.5 | 154.8 | 154.2 | 153.5 | 41 | |
| | 49 | 161.7 | 161.5 | 161.2 | 160.9 | 160.6 | 160.3 | 160.0 | 159.6 | 159.3 | 159.0 | 158.6 | 158.2 | 157.8 | 157.4 | 157.0 | 49 | |
| | 48 | 161.5 | 161.2 | 160.9 | 160.6 | 160.3 | 159.9 | 159.6 | 159.3 | 158.9 | 158.5 | 158.2 | 157.8 | 157.3 | 156.9 | 156.4 | 48 | |
| | 47 | 161.2 | 160.9 | 160.6 | 160.3 | 159.9 | 159.6 | 159.2 | 158.9 | 158.5 | 158.1 | 157.7 | 157.3 | 156.8 | 156.3 | 155.8 | 47 | |
| | 46 | 160.9 | 160.6 | 160.3 | 159.9 | 159.6 | 159.2 | 158.9 | 158.5 | 158.1 | 157.7 | 157.2 | 156.8 | 156.3 | 155.8 | 155.3 | 46 | |
| 11-04 | 45 | 160.6 | 160.3 | 159.9 | 159.6 | 159.2 | 158.8 | 158.4 | 158.0 | 157.6 | 157.2 | 156.7 | 156.2 | 155.7 | 155.2 | 154.6 | 45 | 0-56 |
| | 44 | 160.3 | 159.9 | 159.6 | 159.2 | 158.8 | 158.4 | 158.0 | 157.6 | 157.1 | 156.6 | 156.2 | 155.6 | 155.1 | 154.5 | 154.0 | 44 | |
| | 43 | 159.9 | 159.6 | 159.2 | 158.8 | 158.4 | 158.0 | 157.5 | 157.1 | 156.6 | 156.1 | 155.6 | 155.0 | 154.5 | 153.9 | 153.2 | 43 | |
| | 42 | 159.6 | 159.2 | 158.8 | 158.4 | 157.9 | 157.5 | 157.0 | 156.6 | 156.1 | 155.5 | 155.0 | 154.4 | 153.8 | 153.2 | 152.5 | 42 | |
| | 41 | 159.2 | 158.8 | 158.4 | 157.9 | 157.5 | 157.0 | 156.5 | 156.0 | 155.5 | 154.9 | 154.3 | 153.7 | 153.1 | 152.4 | 151.7 | 41 | |
| | 49 | 160.5 | 160.2 | 159.9 | 159.6 | 159.3 | 158.9 | 158.6 | 158.3 | 157.9 | 157.5 | 157.1 | 156.7 | 156.3 | 155.9 | 155.4 | 49 | |
| | 48 | 160.2 | 159.9 | 159.6 | 159.3 | 158.9 | 158.6 | 158.2 | 157.8 | 157.5 | 157.1 | 156.7 | 156.2 | 155.8 | 155.3 | 154.8 | 48 | |
| | 47 | 159.9 | 159.6 | 159.2 | 158.9 | 158.6 | 158.2 | 157.8 | 157.4 | 157.0 | 156.6 | 156.2 | 155.7 | 155.3 | 154.8 | 154.2 | 47 | |
| | 46 | 159.6 | 159.3 | 158.9 | 158.6 | 158.2 | 157.8 | 157.4 | 157.0 | 156.6 | 156.1 | 155.7 | 155.2 | 154.7 | 154.2 | 153.6 | 46 | |
| 11-00 | 45 | 159.3 | 158.9 | 158.5 | 158.2 | 157.8 | 157.4 | 157.0 | 156.5 | 156.1 | 155.6 | 155.1 | 154.6 | 154.1 | 153.5 | 152.9 | 45 | 1-00 |
| | 44 | 158.9 | 158.5 | 158.2 | 157.8 | 157.4 | 156.9 | 156.5 | 156.1 | 155.6 | 155.1 | 154.6 | 154.0 | 153.5 | 152.9 | 152.2 | 44 | |
| | 43 | 158.6 | 158.2 | 157.8 | 157.4 | 156.9 | 156.5 | 156.0 | 155.6 | 155.1 | 154.5 | 154.0 | 153.4 | 152.8 | 152.2 | 151.5 | 43 | |
| | 42 | 158.2 | 157.8 | 157.3 | 156.9 | 156.5 | 156.0 | 155.5 | 155.0 | 154.5 | 153.9 | 153.3 | 152.7 | 152.1 | 151.4 | 150.7 | 42 | |
| | 41 | 157.8 | 157.4 | 156.9 | 156.5 | 156.0 | 155.5 | 155.0 | 154.4 | 153.9 | 153.3 | 152.7 | 152.0 | 151.3 | 150.6 | 149.9 | 41 | |
| | 49 | 159.3 | 158.9 | 158.6 | 158.3 | 157.9 | 157.6 | 157.2 | 156.9 | 156.5 | 156.1 | 155.7 | 155.3 | 154.8 | 154.4 | 153.9 | 49 | |
| | 48 | 158.9 | 158.6 | 158.3 | 157.9 | 157.6 | 157.2 | 156.8 | 156.4 | 156.0 | 155.6 | 155.2 | 154.8 | 154.3 | 153.8 | 153.3 | 48 | |
| | 47 | 158.6 | 158.3 | 157.9 | 157.6 | 157.2 | 156.8 | 156.4 | 156.0 | 155.6 | 155.2 | 154.7 | 154.2 | 153.7 | 153.2 | 152.6 | 47 | |
| | 46 | 158.3 | 157.9 | 157.6 | 157.2 | 156.8 | 156.4 | 156.0 | 155.6 | 155.1 | 154.7 | 154.2 | 153.7 | 153.1 | 152.6 | 152.0 | 46 | |
| 10-56 | 45 | 157.9 | 157.6 | 157.2 | 156.8 | 156.4 | 156.0 | 155.5 | 155.0 | 154.6 | 154.1 | 153.6 | 153.1 | 152.5 | 151.9 | 151.3 | 45 | 1-04 |
| | 44 | 157.6 | 157.2 | 156.8 | 156.4 | 155.9 | 155.5 | 155.0 | 154.6 | 154.1 | 153.5 | 153.0 | 152.4 | 151.8 | 151.2 | 150.6 | 44 | |
| | 43 | 157.2 | 156.8 | 156.4 | 155.9 | 155.5 | 155.0 | 154.5 | 154.0 | 153.5 | 153.0 | 152.4 | 151.8 | 151.2 | 150.5 | 149.8 | 43 | |
| | 42 | 156.8 | 156.4 | 155.9 | 155.5 | 155.0 | 154.5 | 154.0 | 153.5 | 152.9 | 152.3 | 151.7 | 151.1 | 150.4 | 149.7 | 148.9 | 42 | |
| | 41 | 156.4 | 156.0 | 155.5 | 155.0 | 154.5 | 154.0 | 153.4 | 152.9 | 152.3 | 151.7 | 151.0 | 150.4 | 149.6 | 148.9 | 148.1 | 41 | |
| | 49 | 158.0 | 157.6 | 157.3 | 157.0 | 156.6 | 156.3 | 155.9 | 155.5 | 155.1 | 154.7 | 154.2 | 153.8 | 153.3 | 152.9 | 152.4 | 49 | |
| | 48 | 157.6 | 157.3 | 157.0 | 156.6 | 156.2 | 155.9 | 155.5 | 155.1 | 154.6 | 154.2 | 153.7 | 153.3 | 152.8 | 152.3 | 151.7 | 48 | |
| | 47 | 157.3 | 157.0 | 156.6 | 156.2 | 155.8 | 155.5 | 155.0 | 154.6 | 154.2 | 153.7 | 153.2 | 152.7 | 152.2 | 151.6 | 151.1 | 47 | |
| | 46 | 157.0 | 156.6 | 156.2 | 155.8 | 155.4 | 155.0 | 154.6 | 154.1 | 153.6 | 153.2 | 152.7 | 152.1 | 151.6 | 151.0 | 150.4 | 46 | |
| 10-52 | 45 | 156.6 | 156.2 | 155.8 | 155.4 | 155.0 | 154.6 | 154.1 | 153.6 | 153.1 | 152.6 | 152.1 | 151.5 | 150.9 | 150.3 | 149.7 | 45 | 1-08 |
| | 44 | 156.3 | 155.8 | 155.4 | 155.0 | 154.5 | 154.1 | 153.6 | 153.1 | 152.6 | 152.0 | 151.5 | 150.9 | 150.3 | 149.6 | 148.9 | 44 | |
| | 43 | 155.9 | 155.4 | 155.0 | 154.5 | 154.1 | 153.6 | 153.1 | 152.5 | 152.0 | 151.4 | 150.8 | 150.2 | 149.5 | 148.8 | 148.1 | 43 | |
| | 42 | 155.5 | 155.0 | 154.5 | 154.1 | 153.6 | 153.1 | 152.5 | 152.0 | 151.4 | 150.8 | 150.1 | 149.5 | 148.8 | 148.0 | 147.2 | 42 | |
| | 41 | 155.0 | 154.6 | 154.1 | 153.6 | 153.0 | 152.5 | 151.9 | 151.3 | 150.7 | 150.1 | 149.4 | 148.7 | 147.9 | 147.2 | 146.4 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 164.6 | 164.3 | 164.0 | 163.6 | 163.3 | 162.8 | 162.4 | 162.0 | 161.5 | 161.0 | 160.4 | 159.8 | 159.2 | 158.5 | 157.7 | 49 | |
| | 48 | 164.3 | 163.9 | 163.5 | 163.2 | 162.7 | 162.3 | 161.9 | 161.4 | 160.8 | 160.3 | 159.7 | 159.0 | 158.3 | 157.5 | 156.7 | 48 | |
| | 47 | 163.8 | 163.5 | 163.1 | 162.6 | 162.2 | 161.7 | 161.2 | 160.7 | 160.1 | 159.5 | 158.8 | 158.1 | 157.3 | 156.5 | 155.6 | 47 | |
| | 46 | 163.4 | 163.0 | 162.5 | 162.1 | 161.6 | 161.1 | 160.6 | 160.0 | 159.4 | 158.7 | 158.0 | 157.2 | 156.3 | 155.4 | 154.3 | 46 | |
| 11-24 | 45 | 162.9 | 162.5 | 162.0 | 161.5 | 161.0 | 160.5 | 159.9 | 159.2 | 158.6 | 157.8 | 157.0 | 156.1 | 155.2 | 154.1 | 153.0 | 45 | 0-36 |
| | 44 | 162.4 | 161.9 | 161.5 | 160.9 | 160.4 | 159.8 | 159.1 | 158.4 | 157.7 | 156.8 | 156.0 | 155.0 | 153.9 | 152.7 | 151.4 | 44 | |
| | 43 | 161.9 | 161.4 | 160.8 | 160.3 | 159.6 | 159.0 | 158.3 | 157.5 | 156.7 | 155.8 | 154.8 | 153.7 | 152.5 | 151.2 | 149.7 | 43 | |
| | 42 | 161.3 | 160.7 | 160.2 | 159.5 | 158.9 | 158.2 | 157.4 | 156.6 | 155.6 | 154.6 | 153.5 | 152.3 | 151.0 | 149.5 | 147.9 | 42 | |
| | 41 | 160.7 | 160.1 | 159.4 | 158.8 | 158.0 | 157.3 | 156.4 | 155.5 | 154.5 | 153.4 | 152.1 | 150.8 | 149.3 | 147.6 | 145.7 | 41 | |
| | 49 | 163.0 | 162.6 | 162.3 | 161.9 | 161.5 | 161.0 | 160.5 | 160.0 | 159.5 | 159.0 | 158.4 | 157.7 | 157.0 | 156.2 | 155.4 | 49 | |
| | 48 | 162.6 | 162.2 | 161.8 | 161.4 | 160.9 | 160.4 | 159.9 | 159.4 | 158.8 | 158.2 | 157.5 | 156.8 | 156.1 | 155.2 | 154.3 | 48 | |
| | 47 | 162.1 | 161.7 | 161.3 | 160.8 | 160.3 | 159.8 | 159.3 | 158.7 | 158.1 | 157.4 | 156.7 | 155.9 | 155.0 | 154.1 | 153.1 | 47 | |
| | 46 | 161.6 | 161.2 | 160.7 | 160.2 | 159.7 | 159.1 | 158.5 | 157.9 | 157.2 | 156.5 | 155.7 | 154.8 | 153.9 | 152.9 | 151.8 | 46 | |
| 11-20 | 45 | 161.1 | 160.6 | 160.1 | 159.6 | 159.0 | 158.4 | 157.8 | 157.1 | 156.3 | 155.5 | 154.7 | 153.7 | 152.7 | 151.5 | 150.3 | 45 | 0-40 |
| | 44 | 160.5 | 160.0 | 159.5 | 158.9 | 158.3 | 157.6 | 156.9 | 156.2 | 155.4 | 154.5 | 153.5 | 152.5 | 151.3 | 150.1 | 148.7 | 44 | |
| | 43 | 160.0 | 159.4 | 158.8 | 158.2 | 157.5 | 156.8 | 156.1 | 155.2 | 154.3 | 153.4 | 152.3 | 151.1 | 149.9 | 148.5 | 146.9 | 43 | |
| | 42 | 159.3 | 158.7 | 158.1 | 157.4 | 156.7 | 155.9 | 155.1 | 154.2 | 153.2 | 152.1 | 150.9 | 149.6 | 148.2 | 146.6 | 144.9 | 42 | |
| | 41 | 158.6 | 158.0 | 157.3 | 156.6 | 155.8 | 155.0 | 154.0 | 153.0 | 151.9 | 150.8 | 149.5 | 148.0 | 146.4 | 144.7 | 142.7 | 41 | |
| | 49 | 161.3 | 160.9 | 160.5 | 160.1 | 159.7 | 159.2 | 158.7 | 158.1 | 157.6 | 157.0 | 156.3 | 155.6 | 154.9 | 154.0 | 153.2 | 49 | |
| | 48 | 160.9 | 160.5 | 160.0 | 159.6 | 159.1 | 158.6 | 158.0 | 157.4 | 156.8 | 156.1 | 155.4 | 154.7 | 153.8 | 153.0 | 152.0 | 48 | |
| | 47 | 160.4 | 159.9 | 159.5 | 159.0 | 158.4 | 157.9 | 157.3 | 156.7 | 156.0 | 155.3 | 154.5 | 153.6 | 152.7 | 151.8 | 150.7 | 47 | |
| | 46 | 159.9 | 159.4 | 158.9 | 158.3 | 157.8 | 157.2 | 156.5 | 155.8 | 155.1 | 154.3 | 153.5 | 152.5 | 151.6 | 150.5 | 149.3 | 46 | |
| 11-16 | 45 | 159.3 | 158.8 | 158.2 | 157.7 | 157.1 | 156.4 | 155.7 | 155.0 | 154.2 | 153.3 | 152.4 | 151.3 | 150.2 | 149.0 | 147.7 | 45 | 0-44 |
| | 44 | 158.7 | 158.1 | 157.6 | 156.9 | 156.3 | 155.6 | 154.8 | 154.0 | 153.1 | 152.2 | 151.2 | 150.0 | 148.8 | 147.5 | 146.0 | 44 | |
| | 43 | 158.1 | 157.5 | 156.8 | 156.2 | 155.4 | 154.7 | 153.8 | 153.0 | 152.0 | 151.0 | 149.8 | 148.6 | 147.3 | 145.8 | 144.1 | 43 | |
| | 42 | 157.4 | 156.7 | 156.1 | 155.3 | 154.6 | 153.7 | 152.8 | 151.8 | 150.8 | 149.7 | 148.4 | 147.0 | 145.6 | 143.9 | 142.1 | 42 | |
| | 41 | 156.6 | 156.0 | 155.2 | 154.4 | 153.6 | 152.7 | 151.7 | 150.6 | 149.5 | 148.2 | 146.8 | 145.3 | 143.7 | 141.9 | 139.8 | 41 | |
| | 49 | 159.7 | 159.3 | 158.9 | 158.4 | 157.9 | 157.4 | 156.9 | 156.3 | 155.7 | 155.0 | 154.3 | 153.6 | 152.8 | 151.9 | 151.0 | 49 | |
| | 48 | 159.2 | 158.8 | 158.3 | 157.8 | 157.3 | 156.7 | 156.1 | 155.5 | 154.9 | 154.1 | 153.4 | 152.6 | 151.7 | 150.7 | 149.7 | 48 | |
| | 47 | 158.7 | 158.2 | 157.7 | 157.2 | 156.6 | 156.0 | 155.4 | 154.7 | 153.9 | 153.2 | 152.4 | 151.5 | 150.5 | 149.5 | 148.4 | 47 | |
| | 46 | 158.1 | 157.6 | 157.1 | 156.5 | 155.9 | 155.2 | 154.6 | 153.8 | 153.0 | 152.2 | 151.3 | 150.3 | 149.3 | 148.1 | 146.9 | 46 | |
| 11-12 | 45 | 157.5 | 157.0 | 156.4 | 155.8 | 155.1 | 154.4 | 153.7 | 152.9 | 152.0 | 151.1 | 150.1 | 149.1 | 147.9 | 146.6 | 145.3 | 45 | 0-48 |
| | 44 | 156.9 | 156.3 | 155.6 | 155.0 | 154.3 | 153.5 | 152.7 | 151.9 | 150.9 | 149.9 | 148.9 | 147.7 | 146.4 | 145.0 | 143.5 | 44 | |
| | 43 | 156.2 | 155.6 | 154.9 | 154.2 | 153.4 | 152.6 | 151.7 | 150.8 | 149.8 | 148.7 | 147.5 | 146.2 | 144.8 | 143.2 | 141.5 | 43 | |
| | 42 | 155.5 | 154.8 | 154.1 | 153.3 | 152.5 | 151.6 | 150.6 | 149.6 | 148.5 | 147.3 | 146.0 | 144.6 | 143.0 | 141.3 | 139.4 | 42 | |
| | 41 | 154.7 | 153.9 | 153.2 | 152.3 | 151.4 | 150.5 | 149.4 | 148.3 | 147.1 | 145.8 | 144.3 | 142.8 | 141.0 | 139.1 | 137.1 | 41 | |
| | 49 | 158.1 | 157.7 | 157.2 | 156.7 | 156.2 | 155.6 | 155.1 | 154.4 | 153.8 | 153.1 | 152.4 | 151.6 | 150.7 | 149.8 | 148.8 | 49 | |
| | 48 | 157.6 | 157.1 | 156.6 | 156.1 | 155.5 | 154.9 | 154.3 | 153.6 | 152.9 | 152.2 | 151.4 | 150.5 | 149.6 | 148.6 | 147.5 | 48 | |
| | 47 | 157.0 | 156.5 | 156.0 | 155.4 | 154.8 | 154.2 | 153.5 | 152.8 | 152.0 | 151.2 | 150.3 | 149.4 | 148.4 | 147.3 | 146.1 | 47 | |
| | 46 | 156.4 | 155.8 | 155.3 | 154.7 | 154.0 | 153.3 | 152.6 | 151.8 | 151.0 | 150.1 | 149.2 | 148.1 | 147.0 | 145.8 | 144.5 | 46 | |
| 11-08 | 45 | 155.9 | 155.2 | 154.6 | 153.9 | 153.2 | 152.5 | 151.7 | 150.8 | 149.9 | 149.0 | 147.9 | 146.8 | 145.6 | 144.3 | 142.9 | 45 | 0-52 |
| | 44 | 155.1 | 154.5 | 153.8 | 153.1 | 152.3 | 151.5 | 150.7 | 149.8 | 148.8 | 147.8 | 146.6 | 145.4 | 144.1 | 142.6 | 141.0 | 44 | |
| | 43 | 154.4 | 153.7 | 153.0 | 152.2 | 151.4 | 150.5 | 149.6 | 148.6 | 147.6 | 146.4 | 145.2 | 143.8 | 142.4 | 140.8 | 139.0 | 43 | |
| | 42 | 153.6 | 152.9 | 152.1 | 151.3 | 150.4 | 149.5 | 148.5 | 147.4 | 146.2 | 145.0 | 143.6 | 142.2 | 140.5 | 138.8 | 136.9 | 42 | |
| | 41 | 152.8 | 152.0 | 151.2 | 150.3 | 149.3 | 148.3 | 147.2 | 146.1 | 144.8 | 143.4 | 141.9 | 140.3 | 138.5 | 136.6 | 134.5 | 41 | |
| | 49 | 156.5 | 156.0 | 155.5 | 155.0 | 154.5 | 153.9 | 153.3 | 152.6 | 151.9 | 151.2 | 150.4 | 149.6 | 148.7 | 147.8 | 146.7 | 49 | |
| | 48 | 155.9 | 155.4 | 154.9 | 154.4 | 153.7 | 153.1 | 152.5 | 151.8 | 151.0 | 150.2 | 149.4 | 148.5 | 147.5 | 146.5 | 145.4 | 48 | |
| | 47 | 155.3 | 154.8 | 154.3 | 153.6 | 153.0 | 152.3 | 151.6 | 150.9 | 150.1 | 149.2 | 148.3 | 147.3 | 146.3 | 145.1 | 143.9 | 47 | |
| | 46 | 154.7 | 154.1 | 153.5 | 152.9 | 152.2 | 151.5 | 150.7 | 149.9 | 149.0 | 148.1 | 147.1 | 146.0 | 144.9 | 143.6 | 142.3 | 46 | |
| 11-04 | 45 | 154.0 | 153.4 | 152.8 | 152.1 | 151.3 | 150.6 | 149.7 | 148.9 | 147.9 | 146.9 | 145.8 | 144.7 | 143.4 | 142.0 | 140.6 | 45 | 0-56 |
| | 44 | 153.3 | 152.7 | 152.0 | 151.2 | 150.4 | 149.6 | 148.7 | 147.8 | 146.7 | 145.6 | 144.5 | 143.2 | 141.8 | 140.3 | 138.7 | 44 | |
| | 43 | 152.6 | 151.8 | 151.1 | 150.3 | 149.5 | 148.5 | 147.6 | 146.6 | 145.4 | 144.3 | 143.0 | 141.6 | 140.1 | 138.4 | 136.7 | 43 | |
| | 42 | 151.7 | 151.0 | 150.2 | 149.3 | 148.4 | 147.4 | 146.4 | 145.3 | 144.1 | 142.8 | 141.4 | 139.9 | 138.2 | 136.4 | 134.5 | 42 | |
| | 41 | 150.9 | 150.1 | 149.2 | 148.3 | 147.3 | 146.2 | 145.1 | 143.9 | 142.6 | 141.2 | 139.6 | 138.0 | 136.2 | 134.2 | 132.1 | 41 | |
| | 49 | 154.9 | 154.4 | 153.9 | 153.4 | 152.8 | 152.2 | 151.5 | 150.9 | 150.1 | 149.3 | 148.6 | 147.7 | 146.8 | 145.8 | 144.7 | 49 | |
| | 48 | 154.3 | 153.8 | 153.2 | 152.7 | 152.0 | 151.4 | 150.7 | 150.0 | 149.2 | 148.4 | 147.5 | 146.5 | 145.5 | 144.5 | 143.3 | 48 | |
| | 47 | 153.7 | 153.1 | 152.5 | 151.9 | 151.3 | 150.5 | 149.8 | 149.0 | 148.2 | 147.3 | 146.3 | 145.3 | 144.2 | 143.0 | 141.8 | 47 | |
| | 46 | 153.0 | 152.4 | 151.8 | 151.1 | 150.4 | 149.7 | 148.9 | 148.0 | 147.1 | 146.1 | 145.1 | 144.0 | 142.8 | 141.5 | 140.1 | 46 | |
| 11-00 | 45 | 152.3 | 151.7 | 151.0 | 150.3 | 149.5 | 148.7 | 147.8 | 146.9 | 145.9 | 144.9 | 143.8 | 142.6 | 141.3 | 139.9 | 138.4 | 45 | 1-00 |
| | 44 | 151.6 | 150.9 | 150.2 | 149.4 | 148.6 | 147.7 | 146.8 | 145.8 | 144.7 | 143.6 | 142.4 | 141.1 | 139.6 | 138.1 | 136.5 | 44 | |
| | 43 | 150.8 | 150.1 | 149.3 | 148.4 | 147.6 | 146.6 | 145.6 | 144.5 | 143.4 | 142.2 | 140.8 | 139.4 | 137.9 | 136.2 | 134.4 | 43 | |
| | 42 | 149.9 | 149.2 | 148.3 | 147.4 | 146.5 | 145.5 | 144.4 | 143.2 | 142.0 | 140.6 | 139.2 | 137.7 | 136.0 | 134.2 | 132.2 | 42 | |
| | 41 | 149.1 | 148.2 | 147.3 | 146.3 | 145.3 | 144.2 | 143.1 | 141.8 | 140.5 | 139.0 | 137.5 | 135.8 | 133.9 | 131.9 | 129.8 | 41 | |
| | 49 | 153.4 | 152.8 | 152.3 | 151.7 | 151.1 | 150.5 | 149.8 | 149.1 | 148.3 | 147.5 | 146.7 | 145.8 | 144.8 | 143.8 | 142.7 | 49 | |
| | 48 | 152.8 | 152.2 | 151.6 | 151.0 | 150.4 | 149.7 | 148.9 | 148.2 | 147.4 | 146.5 | 145.6 | 144.6 | 143.6 | 142.5 | 141.3 | 48 | |
| | 47 | 152.1 | 151.5 | 150.9 | 150.2 | 149.5 | 148.8 | 148.0 | 147.2 | 146.3 | 145.4 | 144.4 | 143.3 | 142.2 | 141.0 | 139.7 | 47 | |
| | 46 | 151.4 | 150.7 | 150.1 | 149.4 | 148.6 | 147.9 | 147.0 | 146.1 | 145.2 | 144.2 | 143.1 | 142.0 | 140.8 | 139.4 | 138.0 | 46 | |
| 10-56 | 45 | 150.7 | 150.0 | 149.3 | 148.5 | 147.7 | 146.9 | 146.0 | 145.0 | 144.0 | 142.9 | 141.8 | 140.5 | 139.2 | 137.8 | 136.2 | 45 | 1-04 |
| | 44 | 149.9 | 149.2 | 148.4 | 147.6 | 146.7 | 145.8 | 144.9 | 143.8 | 142.7 | 141.6 | 140.3 | 139.0 | 137.5 | 136.0 | 134.3 | 44 | |
| | 43 | 149.1 | 148.3 | 147.5 | 146.6 | 145.7 | 144.7 | 143.7 | 142.6 | 141.4 | 140.1 | 138.8 | 137.3 | 135.7 | 134.1 | 132.2 | 43 | |
| | 42 | 148.2 | 147.3 | 146.5 | 145.5 | 144.6 | 143.5 | 142.4 | 141.2 | 139.9 | 138.6 | 137.1 | 135.5 | 133.8 | 132.0 | 130.0 | 42 | |
| | 41 | 147.2 | 146.4 | 145.4 | 144.4 | 143.4 | 142.2 | 141.0 | 139.8 | 138.4 | 136.9 | 135.3 | 133.6 | 131.8 | 129.8 | 127.6 | 41 | |
| | 49 | 151.8 | 151.3 | 150.7 | 150.1 | 149.5 | 148.8 | 148.1 | 147.4 | 146.6 | 145.8 | 144.9 | 144.0 | 143.0 | 142.0 | 140.8 | 49 | |
| | 48 | 151.2 | 150.6 | 150.0 | 149.4 | 148.7 | 148.0 | 147.2 | 146.4 | 145.6 | 144.7 | 143.7 | 142.7 | 141.7 | 140.5 | 139.3 | 48 | |
| | 47 | 150.5 | 149.9 | 149.2 | 148.5 | 147.8 | 147.1 | 146.2 | 145.4 | 144.5 | 143.5 | 142.5 | 141.4 | 140.3 | 139.0 | 137.7 | 47 | |
| | 46 | 149.8 | 149.1 | 148.4 | 147.7 | 146.9 | 146.1 | 145.2 | 144.3 | 143.4 | 142.3 | 141.2 | 140.1 | 138.8 | 137.5 | 136.0 | 46 | |
| 10-52 | 45 | 149.0 | 148.3 | 147.6 | 146.8 | 146.0 | 145.1 | 144.2 | 143.2 | 142.1 | 141.0 | 139.8 | 138.6 | 137.2 | 135.8 | 134.2 | 45 | 1-08 |
| | 44 | 148.2 | 147.5 | 146.7 | 145.8 | 144.9 | 144.0 | 143.0 | 142.0 | 140.9 | 139.6 | 138.4 | 137.0 | 135.5 | 133.9 | 132.2 | 44 | |
| | 43 | 147.4 | 146.6 | 145.7 | 144.8 | 143.9 | 142.9 | 141.8 | 140.7 | 139.5 | 138.2 | 136.8 | 135.3 | 133.7 | 132.0 | 130.2 | 43 | |
| | 42 | 146.4 | 145.6 | 144.7 | 143.7 | 142.7 | 141.6 | 140.5 | 139.3 | 138.0 | 136.6 | 135.1 | 133.5 | 131.8 | 129.9 | 127.9 | 42 | |
| | 41 | 145.5 | 144.6 | 143.6 | 142.6 | 141.5 | 140.3 | 139.1 | 137.8 | 136.4 | 134.9 | 133.3 | 131.6 | 129.7 | 127.7 | 125.6 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 158.0 | 157.6 | 157.3 | 157.0 | 156.6 | 156.3 | 155.9 | 155.5 | 155.1 | 154.7 | 154.2 | 153.8 | 153.3 | 152.9 | 152.4 | 49 | |
| | 48 | 157.6 | 157.3 | 157.0 | 156.6 | 156.2 | 155.9 | 155.5 | 155.1 | 154.6 | 154.2 | 153.7 | 153.3 | 152.8 | 152.3 | 151.7 | 48 | |
| | 47 | 157.3 | 157.0 | 156.6 | 156.2 | 155.8 | 155.5 | 155.0 | 154.6 | 154.2 | 153.7 | 153.2 | 152.7 | 152.2 | 151.6 | 151.1 | 47 | |
| | 46 | 157.0 | 156.6 | 156.2 | 155.8 | 155.4 | 155.0 | 154.6 | 154.1 | 153.6 | 153.2 | 152.7 | 152.1 | 151.6 | 151.0 | 150.4 | 46 | |
| 10-52 | 45 | 156.6 | 156.2 | 155.8 | 155.4 | 155.0 | 154.6 | 154.1 | 153.6 | 153.1 | 152.6 | 152.1 | 151.5 | 150.9 | 150.3 | 149.7 | 45 | 1-08 |
| | 44 | 156.3 | 155.8 | 155.4 | 155.0 | 154.5 | 154.1 | 153.6 | 153.1 | 152.6 | 152.0 | 151.5 | 150.9 | 150.3 | 149.6 | 148.9 | 44 | |
| | 43 | 155.9 | 155.4 | 155.0 | 154.5 | 154.1 | 153.6 | 153.1 | 152.5 | 152.0 | 151.4 | 150.8 | 150.2 | 149.5 | 148.8 | 148.1 | 43 | |
| | 42 | 155.5 | 155.0 | 154.5 | 154.1 | 153.6 | 153.1 | 152.5 | 152.0 | 151.4 | 150.8 | 150.1 | 149.5 | 148.8 | 148.0 | 147.2 | 42 | |
| | 41 | 155.0 | 154.6 | 154.1 | 153.6 | 153.0 | 152.5 | 151.9 | 151.3 | 150.7 | 150.1 | 149.4 | 148.7 | 147.9 | 147.2 | 146.4 | 41 | |
| | 49 | 156.7 | 156.4 | 156.0 | 155.7 | 155.3 | 154.9 | 154.5 | 154.1 | 153.7 | 153.3 | 152.8 | 152.4 | 151.9 | 151.4 | 150.9 | 49 | |
| | 48 | 156.4 | 156.0 | 155.7 | 155.3 | 154.9 | 154.5 | 154.1 | 153.7 | 153.2 | 152.8 | 152.3 | 151.8 | 151.3 | 150.8 | 150.2 | 48 | |
| | 47 | 156.1 | 155.7 | 155.3 | 154.9 | 154.5 | 154.1 | 153.7 | 153.2 | 152.7 | 152.3 | 151.8 | 151.2 | 150.7 | 150.1 | 149.5 | 47 | |
| | 46 | 155.7 | 155.3 | 154.9 | 154.5 | 154.1 | 153.6 | 153.2 | 152.7 | 152.2 | 151.7 | 151.2 | 150.6 | 150.1 | 149.5 | 148.8 | 46 | |
| 10-48 | 45 | 155.3 | 154.9 | 154.5 | 154.1 | 153.6 | 153.2 | 152.7 | 152.2 | 151.7 | 151.1 | 150.6 | 150.0 | 149.4 | 148.8 | 148.1 | 45 | 1-12 |
| | 44 | 154.9 | 154.5 | 154.1 | 153.6 | 153.2 | 152.7 | 152.2 | 151.6 | 151.1 | 150.5 | 149.9 | 149.3 | 148.7 | 148.0 | 147.3 | 44 | |
| | 43 | 154.5 | 154.1 | 153.6 | 153.2 | 152.7 | 152.1 | 151.6 | 151.1 | 150.5 | 149.9 | 149.3 | 148.6 | 147.9 | 147.2 | 146.5 | 43 | |
| | 42 | 154.1 | 153.6 | 153.1 | 152.7 | 152.1 | 151.6 | 151.0 | 150.5 | 149.9 | 149.2 | 148.6 | 147.9 | 147.1 | 146.4 | 145.6 | 42 | |
| | 41 | 153.7 | 153.2 | 152.8 | 152.1 | 151.6 | 151.0 | 150.4 | 149.8 | 149.2 | 148.5 | 147.8 | 147.1 | 146.3 | 145.5 | 144.7 | 41 | |
| | 49 | 155.5 | 155.1 | 154.8 | 154.4 | 154.0 | 153.6 | 153.2 | 152.8 | 152.3 | 151.9 | 151.4 | 151.0 | 150.5 | 149.9 | 149.4 | 49 | |
| | 48 | 155.1 | 154.8 | 154.4 | 154.0 | 153.6 | 153.2 | 152.8 | 152.3 | 151.9 | 151.4 | 150.9 | 150.4 | 149.9 | 149.3 | 148.7 | 48 | |
| | 47 | 154.8 | 154.4 | 154.0 | 153.6 | 153.2 | 152.7 | 152.3 | 151.8 | 151.3 | 150.8 | 150.3 | 149.8 | 149.2 | 148.6 | 148.0 | 47 | |
| | 46 | 154.4 | 154.0 | 153.6 | 153.2 | 152.7 | 152.3 | 151.8 | 151.3 | 150.8 | 150.3 | 149.7 | 149.2 | 148.6 | 148.0 | 147.3 | 46 | |
| 10-44 | 45 | 154.0 | 153.6 | 153.2 | 152.7 | 152.3 | 151.8 | 151.3 | 150.8 | 150.2 | 149.7 | 149.1 | 148.5 | 147.9 | 147.2 | 146.5 | 45 | 1-16 |
| | 44 | 153.6 | 153.2 | 152.7 | 152.3 | 151.8 | 151.3 | 150.8 | 150.2 | 149.7 | 149.1 | 148.4 | 147.8 | 147.1 | 146.4 | 145.7 | 44 | |
| | 43 | 153.2 | 152.8 | 152.3 | 151.8 | 151.3 | 150.7 | 150.2 | 149.6 | 149.0 | 148.4 | 147.8 | 147.1 | 146.4 | 145.6 | 144.9 | 43 | |
| | 42 | 152.8 | 152.3 | 151.8 | 151.3 | 150.7 | 150.2 | 149.6 | 149.0 | 148.4 | 147.7 | 147.0 | 146.3 | 145.6 | 144.8 | 144.0 | 42 | |
| | 41 | 152.3 | 151.8 | 151.3 | 150.7 | 150.2 | 149.6 | 149.0 | 148.3 | 147.7 | 147.0 | 146.3 | 145.5 | 144.7 | 143.9 | 143.0 | 41 | |
| | 49 | 154.3 | 153.9 | 153.5 | 153.1 | 152.7 | 152.3 | 151.9 | 151.5 | 151.0 | 150.5 | 150.0 | 149.6 | 149.0 | 148.5 | 147.9 | 49 | |
| | 48 | 153.9 | 153.5 | 153.1 | 152.7 | 152.3 | 151.9 | 151.4 | 151.0 | 150.5 | 150.0 | 149.5 | 149.0 | 148.4 | 147.9 | 147.2 | 48 | |
| | 47 | 153.6 | 153.1 | 152.7 | 152.3 | 151.9 | 151.4 | 150.9 | 150.5 | 149.9 | 149.4 | 148.9 | 148.3 | 147.7 | 147.1 | 146.5 | 47 | |
| | 46 | 153.2 | 152.8 | 152.3 | 151.9 | 151.4 | 150.9 | 150.4 | 149.9 | 149.4 | 148.9 | 148.3 | 147.7 | 147.1 | 146.5 | 145.8 | 46 | |
| 10-40 | 45 | 152.8 | 152.3 | 151.9 | 151.4 | 150.9 | 150.4 | 149.9 | 149.4 | 148.8 | 148.2 | 147.6 | 147.0 | 146.4 | 145.7 | 145.0 | 45 | 1-20 |
| | 44 | 152.4 | 151.9 | 151.4 | 150.9 | 150.4 | 149.9 | 149.4 | 148.8 | 148.2 | 147.6 | 147.0 | 146.3 | 145.6 | 144.9 | 144.2 | 44 | |
| | 43 | 151.9 | 151.4 | 150.9 | 150.4 | 149.9 | 149.3 | 148.8 | 148.2 | 147.6 | 146.9 | 146.3 | 145.6 | 144.8 | 144.1 | 143.3 | 43 | |
| | 42 | 151.5 | 151.0 | 150.4 | 149.9 | 149.3 | 148.8 | 148.2 | 147.5 | 146.9 | 146.2 | 145.5 | 144.8 | 144.0 | 143.2 | 142.4 | 42 | |
| | 41 | 151.0 | 150.5 | 149.9 | 149.3 | 148.8 | 148.2 | 147.5 | 146.9 | 146.2 | 145.5 | 144.7 | 144.0 | 143.1 | 142.3 | 141.4 | 41 | |
| | 49 | 153.0 | 152.7 | 152.3 | 151.9 | 151.5 | 151.0 | 150.6 | 150.1 | 149.7 | 149.2 | 148.7 | 148.2 | 147.6 | 147.1 | 146.5 | 49 | |
| | 48 | 152.7 | 152.3 | 151.9 | 151.5 | 151.0 | 150.6 | 150.1 | 149.6 | 149.1 | 148.6 | 148.1 | 147.6 | 147.0 | 146.4 | 145.8 | 48 | |
| | 47 | 152.3 | 151.9 | 151.5 | 151.0 | 150.6 | 150.1 | 149.6 | 149.1 | 148.6 | 148.0 | 147.5 | 146.9 | 146.3 | 145.7 | 145.0 | 47 | |
| | 46 | 151.9 | 151.5 | 151.0 | 150.6 | 150.1 | 149.6 | 149.1 | 148.6 | 148.0 | 147.5 | 146.9 | 146.3 | 145.6 | 145.0 | 144.3 | 46 | |
| 10-36 | 45 | 151.5 | 151.1 | 150.6 | 150.1 | 149.6 | 149.1 | 148.5 | 148.0 | 147.4 | 146.8 | 146.2 | 145.6 | 144.9 | 144.2 | 143.5 | 45 | 1-24 |
| | 44 | 151.1 | 150.7 | 150.1 | 149.6 | 149.1 | 148.5 | 148.0 | 147.4 | 146.8 | 146.2 | 145.5 | 144.8 | 144.1 | 143.4 | 142.6 | 44 | |
| | 43 | 150.6 | 150.1 | 149.6 | 149.1 | 148.5 | 148.0 | 147.4 | 146.8 | 146.1 | 145.5 | 144.8 | 144.1 | 143.3 | 142.6 | 141.7 | 43 | |
| | 42 | 150.2 | 149.6 | 149.1 | 148.6 | 148.0 | 147.4 | 146.7 | 146.1 | 145.4 | 144.8 | 144.0 | 143.3 | 142.5 | 141.7 | 140.8 | 42 | |
| | 41 | 149.7 | 149.1 | 148.6 | 148.0 | 147.4 | 146.7 | 146.1 | 145.4 | 144.7 | 144.0 | 143.2 | 142.4 | 141.6 | 140.7 | 139.8 | 41 | |
| | 49 | 151.8 | 151.4 | 151.0 | 150.6 | 150.2 | 149.8 | 149.3 | 148.8 | 148.3 | 147.8 | 147.3 | 146.8 | 146.2 | 145.7 | 145.1 | 49 | |
| | 48 | 151.5 | 151.1 | 150.6 | 150.2 | 149.8 | 149.3 | 148.8 | 148.3 | 147.8 | 147.3 | 146.7 | 146.2 | 145.6 | 145.0 | 144.4 | 48 | |
| | 47 | 151.1 | 150.7 | 150.2 | 149.8 | 149.3 | 148.8 | 148.3 | 147.8 | 147.2 | 146.7 | 146.1 | 145.5 | 144.9 | 144.3 | 143.6 | 47 | |
| | 46 | 150.7 | 150.2 | 149.8 | 149.3 | 148.8 | 148.3 | 147.8 | 147.2 | 146.7 | 146.1 | 145.5 | 144.8 | 144.2 | 143.5 | 142.8 | 46 | |
| 10-32 | 45 | 150.3 | 149.8 | 149.3 | 148.8 | 148.3 | 147.7 | 147.2 | 146.6 | 146.0 | 145.4 | 144.8 | 144.1 | 143.4 | 142.7 | 142.0 | 45 | 1-28 |
| | 44 | 149.8 | 149.3 | 148.8 | 148.3 | 147.8 | 147.2 | 146.6 | 146.0 | 145.4 | 144.8 | 144.1 | 143.4 | 142.7 | 141.9 | 141.1 | 44 | |
| | 43 | 149.4 | 148.9 | 148.3 | 147.8 | 147.2 | 146.6 | 146.0 | 145.4 | 144.7 | 144.1 | 143.4 | 142.6 | 141.9 | 141.1 | 140.2 | 43 | |
| | 42 | 148.9 | 148.4 | 147.8 | 147.2 | 146.6 | 146.0 | 145.4 | 144.7 | 144.0 | 143.3 | 142.6 | 141.8 | 141.0 | 140.2 | 139.3 | 42 | |
| | 41 | 148.4 | 147.8 | 147.2 | 146.6 | 146.0 | 145.4 | 144.7 | 144.0 | 143.3 | 142.5 | 141.8 | 141.0 | 140.1 | 139.2 | 138.3 | 41 | |
| | 49 | 150.7 | 150.2 | 149.8 | 149.4 | 148.9 | 148.5 | 148.0 | 147.6 | 147.0 | 146.5 | 146.0 | 145.4 | 144.9 | 144.3 | 143.7 | 49 | |
| | 48 | 150.3 | 149.8 | 149.4 | 149.0 | 148.5 | 148.0 | 147.5 | 147.0 | 146.5 | 146.0 | 145.4 | 144.8 | 144.2 | 143.6 | 142.9 | 48 | |
| | 47 | 149.9 | 149.4 | 149.0 | 148.5 | 148.0 | 147.5 | 147.0 | 146.5 | 145.9 | 145.3 | 144.7 | 144.1 | 143.5 | 142.9 | 142.2 | 47 | |
| | 46 | 149.5 | 149.0 | 148.5 | 148.0 | 147.5 | 147.0 | 146.5 | 145.9 | 145.3 | 144.7 | 144.1 | 143.5 | 142.8 | 142.1 | 141.4 | 46 | |
| 10-28 | 45 | 149.0 | 148.5 | 148.0 | 147.5 | 147.0 | 146.4 | 145.9 | 145.3 | 144.7 | 144.1 | 143.4 | 142.7 | 142.0 | 141.3 | 140.5 | 45 | 1-32 |
| | 44 | 148.6 | 148.1 | 147.6 | 147.0 | 146.5 | 145.9 | 145.3 | 144.7 | 144.0 | 143.4 | 142.7 | 142.0 | 141.2 | 140.5 | 139.7 | 44 | |
| | 43 | 148.1 | 147.6 | 147.0 | 146.5 | 145.9 | 145.3 | 144.7 | 144.0 | 143.3 | 142.7 | 141.9 | 141.2 | 140.4 | 139.6 | 138.7 | 43 | |
| | 42 | 147.6 | 147.1 | 146.5 | 145.9 | 145.3 | 144.7 | 144.0 | 143.3 | 142.6 | 141.9 | 141.1 | 140.4 | 139.5 | 138.7 | 137.8 | 42 | |
| | 41 | 147.1 | 146.5 | 145.9 | 145.3 | 144.7 | 144.0 | 143.3 | 142.6 | 141.9 | 141.1 | 140.3 | 139.5 | 138.6 | 137.7 | 136.8 | 41 | |
| | 49 | 149.5 | 149.0 | 148.6 | 148.2 | 147.7 | 147.2 | 146.8 | 146.3 | 145.8 | 145.2 | 144.7 | 144.1 | 143.5 | 142.9 | 142.3 | 49 | |
| | 48 | 149.1 | 148.6 | 148.2 | 147.7 | 147.2 | 146.8 | 146.2 | 145.7 | 145.2 | 144.6 | 144.1 | 143.5 | 142.8 | 142.2 | 141.5 | 48 | |
| | 47 | 148.7 | 148.2 | 147.7 | 147.2 | 146.7 | 146.2 | 145.7 | 145.2 | 144.6 | 144.0 | 143.4 | 142.8 | 142.1 | 141.5 | 140.8 | 47 | |
| | 46 | 148.2 | 147.8 | 147.3 | 146.8 | 146.3 | 145.7 | 145.2 | 144.6 | 144.0 | 143.4 | 142.7 | 142.1 | 141.4 | 140.7 | 140.0 | 46 | |
| 10-24 | 45 | 147.8 | 147.3 | 146.8 | 146.3 | 145.7 | 145.2 | 144.6 | 144.0 | 143.4 | 142.7 | 142.0 | 141.4 | 140.6 | 139.9 | 139.1 | 45 | 1-36 |
| | 44 | 147.4 | 146.8 | 146.3 | 145.7 | 145.2 | 144.6 | 144.0 | 143.4 | 142.7 | 142.0 | 141.3 | 140.6 | 139.8 | 139.0 | 138.2 | 44 | |
| | 43 | 146.9 | 146.3 | 145.8 | 145.2 | 144.6 | 144.0 | 143.3 | 142.7 | 142.0 | 141.3 | 140.5 | 139.8 | 139.0 | 138.2 | 137.3 | 43 | |
| | 42 | 146.4 | 145.8 | 145.2 | 144.6 | 144.0 | 143.3 | 142.7 | 142.0 | 141.2 | 140.5 | 139.7 | 138.9 | 138.1 | 137.2 | 136.3 | 42 | |
| | 41 | 145.8 | 145.2 | 144.6 | 144.0 | 143.3 | 142.7 | 142.0 | 141.3 | 140.5 | 139.7 | 138.9 | 138.1 | 137.2 | 136.3 | 135.3 | 41 | |
| | 49 | 148.3 | 147.9 | 147.4 | 147.0 | 146.5 | 146.0 | 145.5 | 145.0 | 144.5 | 143.9 | 143.4 | 142.8 | 142.2 | 141.6 | 140.9 | 49 | |
| | 48 | 147.9 | 147.4 | 147.0 | 146.5 | 146.0 | 145.5 | 145.0 | 144.5 | 143.9 | 143.3 | 142.7 | 142.1 | 141.5 | 140.9 | 140.2 | 48 | |
| | 47 | 147.5 | 147.0 | 146.5 | 146.0 | 145.5 | 145.0 | 144.4 | 143.9 | 143.3 | 142.7 | 142.1 | 141.5 | 140.8 | 140.1 | 139.4 | 47 | |
| | 46 | 147.1 | 146.6 | 146.1 | 145.5 | 145.0 | 144.4 | 143.9 | 143.3 | 142.7 | 142.1 | 141.4 | 140.7 | 140.0 | 139.3 | 138.6 | 46 | |
| 10-20 | 45 | 146.6 | 146.1 | 145.6 | 145.0 | 144.5 | 143.9 | 143.3 | 142.7 | 142.0 | 141.4 | 140.7 | 140.0 | 139.3 | 138.5 | 137.7 | 45 | 1-40 |
| | 44 | 146.1 | 145.6 | 145.0 | 144.5 | 143.9 | 143.3 | 142.7 | 142.0 | 141.4 | 140.7 | 140.0 | 139.2 | 138.4 | 137.6 | 136.8 | 44 | |
| | 43 | 145.6 | 145.1 | 144.5 | 143.9 | 143.3 | 142.7 | 142.0 | 141.4 | 140.7 | 139.9 | 139.2 | 138.4 | 137.6 | 136.8 | 135.9 | 43 | |
| | 42 | 145.1 | 144.6 | 144.0 | 143.3 | 142.7 | 142.0 | 141.4 | 140.6 | 139.9 | 139.1 | 138.4 | 137.6 | 136.7 | 135.8 | 134.9 | 42 | |
| | 41 | 144.6 | 144.0 | 143.4 | 142.7 | 142.1 | 141.4 | 140.7 | 139.9 | 139.1 | 138.4 | 137.5 | 136.7 | 135.8 | 134.9 | 133.9 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 151.8 | 151.3 | 150.7 | 150.1 | 149.5 | 148.8 | 148.1 | 147.4 | 146.6 | 145.8 | 144.9 | 144.0 | 143.0 | 142.0 | 140.8 | 49 | |
| | 48 | 151.2 | 150.6 | 150.0 | 149.4 | 148.7 | 148.0 | 147.2 | 146.4 | 145.6 | 144.7 | 143.7 | 142.7 | 141.7 | 140.5 | 139.3 | 48 | |
| | 47 | 150.5 | 149.9 | 149.2 | 148.5 | 147.8 | 147.1 | 146.2 | 145.4 | 144.5 | 143.5 | 142.5 | 141.4 | 140.3 | 139.0 | 137.7 | 47 | |
| | 46 | 149.8 | 149.1 | 148.4 | 147.7 | 146.9 | 146.1 | 145.2 | 144.3 | 143.4 | 142.3 | 141.2 | 140.1 | 138.8 | 137.5 | 136.0 | 46 | |
| 10-52 | 45 | 149.0 | 148.3 | 147.6 | 146.8 | 146.0 | 145.1 | 144.2 | 143.2 | 142.1 | 141.0 | 139.8 | 138.6 | 137.2 | 135.8 | 134.2 | 45 | 1-08 |
| | 44 | 148.2 | 147.5 | 146.7 | 145.8 | 144.9 | 144.0 | 143.0 | 142.0 | 140.9 | 139.6 | 138.4 | 137.0 | 135.5 | 133.9 | 132.2 | 44 | |
| | 43 | 147.4 | 146.6 | 145.7 | 144.8 | 143.9 | 142.9 | 141.8 | 140.7 | 139.5 | 138.2 | 136.8 | 135.3 | 133.7 | 132.0 | 130.2 | 43 | |
| | 42 | 146.4 | 145.6 | 144.7 | 143.7 | 142.7 | 141.6 | 140.5 | 139.3 | 138.0 | 136.6 | 135.1 | 133.5 | 131.8 | 129.9 | 127.9 | 42 | |
| | 41 | 145.5 | 144.6 | 143.6 | 142.6 | 141.5 | 140.3 | 139.1 | 137.8 | 136.4 | 134.9 | 133.3 | 131.6 | 129.7 | 127.7 | 125.6 | 41 | |
| | 49 | 150.3 | 149.7 | 149.2 | 148.5 | 147.9 | 147.2 | 146.5 | 145.7 | 144.9 | 144.0 | 143.1 | 142.2 | 141.1 | 140.1 | 138.9 | 49 | |
| | 48 | 149.6 | 149.0 | 148.4 | 147.7 | 147.0 | 146.3 | 145.5 | 144.7 | 143.8 | 142.9 | 141.9 | 140.9 | 139.8 | 138.6 | 137.4 | 48 | |
| | 47 | 148.9 | 148.3 | 147.6 | 146.9 | 146.2 | 145.4 | 144.5 | 143.7 | 142.7 | 141.7 | 140.7 | 139.6 | 138.4 | 137.1 | 135.8 | 47 | |
| | 46 | 148.2 | 147.5 | 146.8 | 146.0 | 145.2 | 144.4 | 143.5 | 142.6 | 141.6 | 140.5 | 139.4 | 138.2 | 136.9 | 135.5 | 134.1 | 46 | |
| 10-48 | 45 | 147.4 | 146.7 | 145.9 | 145.1 | 144.2 | 143.3 | 142.2 | 141.4 | 140.3 | 139.2 | 138.0 | 136.7 | 135.3 | 133.8 | 132.2 | 45 | 1-12 |
| | 44 | 146.6 | 145.8 | 145.0 | 144.1 | 143.2 | 142.2 | 141.2 | 140.1 | 139.0 | 137.8 | 136.5 | 135.1 | 133.6 | 132.0 | 130.3 | 44 | |
| | 43 | 145.7 | 144.9 | 144.0 | 143.1 | 142.1 | 141.1 | 140.0 | 138.8 | 137.6 | 136.3 | 134.9 | 133.4 | 131.8 | 130.0 | 128.2 | 43 | |
| | 42 | 144.8 | 143.9 | 142.9 | 142.0 | 140.9 | 139.8 | 138.7 | 137.4 | 136.1 | 134.7 | 133.2 | 131.6 | 129.8 | 128.0 | 126.0 | 42 | |
| | 41 | 143.8 | 142.8 | 141.8 | 140.8 | 139.7 | 138.7 | 137.2 | 135.9 | 134.5 | 133.0 | 131.4 | 129.6 | 127.8 | 125.8 | 123.6 | 41 | |
| | 49 | 148.8 | 148.2 | 147.6 | 147.0 | 146.3 | 145.6 | 144.8 | 144.0 | 143.2 | 142.3 | 141.4 | 140.4 | 139.4 | 138.2 | 137.1 | 49 | |
| | 48 | 148.1 | 147.5 | 146.8 | 146.2 | 145.4 | 144.7 | 143.8 | 143.0 | 142.1 | 141.2 | 140.2 | 139.1 | 138.0 | 136.8 | 135.5 | 48 | |
| | 47 | 147.4 | 146.7 | 146.0 | 145.3 | 144.5 | 143.7 | 142.9 | 142.0 | 141.0 | 140.0 | 138.9 | 137.8 | 136.6 | 135.3 | 133.9 | 47 | |
| | 46 | 146.6 | 145.9 | 145.2 | 144.4 | 143.6 | 142.7 | 141.8 | 140.8 | 139.8 | 138.7 | 137.6 | 136.4 | 135.1 | 133.7 | 132.2 | 46 | |
| 10-44 | 45 | 145.8 | 145.0 | 144.3 | 143.4 | 142.6 | 141.6 | 140.7 | 139.6 | 138.5 | 137.4 | 136.1 | 134.8 | 133.4 | 131.9 | 130.4 | 45 | 1-16 |
| | 44 | 145.0 | 144.2 | 143.3 | 142.4 | 141.5 | 140.5 | 139.5 | 138.4 | 137.2 | 136.0 | 134.6 | 133.2 | 131.7 | 130.1 | 128.4 | 44 | |
| | 43 | 144.1 | 143.2 | 142.3 | 141.4 | 140.4 | 139.3 | 138.2 | 137.0 | 135.8 | 134.4 | 133.0 | 131.5 | 129.9 | 128.2 | 126.3 | 43 | |
| | 42 | 143.1 | 142.2 | 141.2 | 140.2 | 139.2 | 138.0 | 136.9 | 135.6 | 134.3 | 132.8 | 131.3 | 129.7 | 128.0 | 126.1 | 124.1 | 42 | |
| | 41 | 142.1 | 141.1 | 140.1 | 139.0 | 137.9 | 136.7 | 135.4 | 134.1 | 132.7 | 131.1 | 129.5 | 127.8 | 125.9 | 123.9 | 121.8 | 41 | |
| | 49 | 147.3 | 146.7 | 146.1 | 145.4 | 144.7 | 144.0 | 143.2 | 142.4 | 141.6 | 140.7 | 139.7 | 138.7 | 137.6 | 136.5 | 135.3 | 49 | |
| | 48 | 146.6 | 146.0 | 145.3 | 144.6 | 143.8 | 143.1 | 142.2 | 141.4 | 140.6 | 139.5 | 138.5 | 137.4 | 136.3 | 135.1 | 133.8 | 48 | |
| | 47 | 145.9 | 145.2 | 144.5 | 143.7 | 142.9 | 142.1 | 141.2 | 140.3 | 139.3 | 138.3 | 137.2 | 136.0 | 134.8 | 133.5 | 132.1 | 47 | |
| | 46 | 145.1 | 144.3 | 143.6 | 142.8 | 141.9 | 141.0 | 140.1 | 139.1 | 138.1 | 137.0 | 135.9 | 134.6 | 133.3 | 131.9 | 130.4 | 46 | |
| 10-40 | 45 | 144.3 | 143.5 | 142.7 | 141.8 | 140.9 | 140.0 | 139.0 | 137.9 | 136.8 | 135.6 | 134.4 | 133.1 | 131.7 | 130.2 | 128.6 | 45 | 1-20 |
| | 44 | 143.4 | 142.6 | 141.7 | 140.8 | 139.8 | 138.8 | 137.8 | 136.6 | 135.5 | 134.2 | 132.9 | 131.4 | 129.9 | 128.3 | 126.6 | 44 | |
| | 43 | 142.5 | 141.6 | 140.7 | 139.7 | 138.7 | 137.6 | 136.5 | 135.3 | 134.0 | 132.7 | 131.2 | 129.7 | 128.1 | 126.4 | 124.5 | 43 | |
| | 42 | 141.5 | 140.6 | 139.6 | 138.6 | 137.5 | 136.3 | 135.1 | 133.9 | 132.5 | 131.1 | 129.5 | 127.9 | 126.2 | 124.4 | 122.4 | 42 | |
| | 41 | 140.5 | 139.5 | 138.4 | 137.4 | 136.2 | 135.0 | 133.7 | 132.3 | 130.9 | 129.4 | 127.7 | 126.0 | 124.2 | 122.2 | 120.1 | 41 | |
| | 49 | 145.9 | 145.2 | 144.6 | 143.9 | 143.2 | 142.4 | 141.7 | 140.8 | 139.9 | 139.0 | 138.0 | 137.0 | 135.9 | 134.8 | 133.6 | 49 | |
| | 48 | 145.2 | 144.5 | 143.8 | 143.1 | 142.3 | 141.5 | 140.6 | 139.8 | 138.9 | 137.8 | 136.8 | 135.7 | 134.6 | 133.3 | 132.0 | 48 | |
| | 47 | 144.4 | 143.7 | 142.9 | 142.2 | 141.4 | 140.5 | 139.6 | 138.7 | 137.7 | 136.6 | 135.5 | 134.3 | 133.1 | 131.8 | 130.4 | 47 | |
| | 46 | 143.6 | 142.8 | 142.0 | 141.2 | 140.4 | 139.4 | 138.5 | 137.5 | 136.4 | 135.3 | 134.1 | 132.9 | 131.6 | 130.1 | 128.6 | 46 | |
| 10-36 | 45 | 142.7 | 141.9 | 141.1 | 140.2 | 139.3 | 138.3 | 137.3 | 136.3 | 135.1 | 133.9 | 132.7 | 131.3 | 129.9 | 128.4 | 126.8 | 45 | 1-24 |
| | 44 | 141.8 | 141.0 | 140.1 | 139.2 | 138.2 | 137.2 | 136.1 | 134.9 | 133.8 | 132.5 | 131.1 | 129.7 | 128.2 | 126.6 | 124.9 | 44 | |
| | 43 | 140.9 | 140.0 | 139.1 | 138.1 | 137.0 | 136.0 | 134.8 | 133.6 | 132.3 | 131.0 | 129.5 | 128.0 | 126.4 | 124.7 | 122.8 | 43 | |
| | 42 | 139.9 | 139.0 | 138.0 | 136.9 | 135.8 | 134.7 | 133.4 | 132.2 | 130.8 | 129.3 | 127.8 | 126.2 | 124.5 | 122.6 | 120.7 | 42 | |
| | 41 | 138.9 | 137.9 | 136.8 | 135.7 | 134.5 | 133.3 | 132.0 | 130.6 | 129.2 | 127.6 | 126.0 | 124.3 | 122.5 | 120.5 | 118.4 | 41 | |
| | 49 | 144.4 | 143.8 | 143.1 | 142.4 | 141.7 | 140.9 | 140.1 | 139.2 | 138.4 | 137.4 | 136.4 | 135.4 | 134.3 | 133.1 | 131.9 | 49 | |
| | 48 | 143.7 | 143.0 | 142.3 | 141.6 | 140.8 | 139.9 | 139.1 | 138.2 | 137.2 | 136.2 | 135.2 | 134.1 | 132.9 | 131.7 | 130.3 | 48 | |
| | 47 | 142.9 | 142.2 | 141.4 | 140.6 | 139.8 | 138.9 | 138.0 | 137.1 | 136.1 | 135.0 | 133.9 | 132.7 | 131.4 | 130.1 | 128.7 | 47 | |
| | 46 | 142.1 | 141.3 | 140.5 | 139.7 | 138.8 | 137.9 | 136.9 | 135.9 | 134.8 | 133.7 | 132.5 | 131.2 | 129.9 | 128.5 | 127.0 | 46 | |
| 10-32 | 45 | 141.2 | 140.4 | 139.6 | 138.7 | 137.8 | 136.7 | 135.7 | 134.6 | 133.5 | 132.3 | 131.0 | 129.7 | 128.3 | 126.7 | 125.1 | 45 | 1-28 |
| | 44 | 140.3 | 139.5 | 138.6 | 137.6 | 136.6 | 135.6 | 134.5 | 133.3 | 132.1 | 130.8 | 129.5 | 128.1 | 126.5 | 124.9 | 123.2 | 44 | |
| | 43 | 139.4 | 138.5 | 137.5 | 136.5 | 135.5 | 134.3 | 133.2 | 131.9 | 130.7 | 129.3 | 127.9 | 126.3 | 124.7 | 123.0 | 121.2 | 43 | |
| | 42 | 138.4 | 137.4 | 136.4 | 135.3 | 134.2 | 133.0 | 131.8 | 130.5 | 129.1 | 127.7 | 126.2 | 124.6 | 122.8 | 121.0 | 119.1 | 42 | |
| | 41 | 137.3 | 136.3 | 135.2 | 134.1 | 132.9 | 131.7 | 130.4 | 129.0 | 127.6 | 126.0 | 124.4 | 122.7 | 120.8 | 118.9 | 116.9 | 41 | |
| | 49 | 143.0 | 142.4 | 141.7 | 141.0 | 140.2 | 139.4 | 138.6 | 137.7 | 136.8 | 135.9 | 134.9 | 133.8 | 132.7 | 131.5 | 130.3 | 49 | |
| | 48 | 142.3 | 141.6 | 140.8 | 140.1 | 139.3 | 138.4 | 137.6 | 136.6 | 135.7 | 134.7 | 133.6 | 132.5 | 131.3 | 130.0 | 128.7 | 48 | |
| | 47 | 141.5 | 140.7 | 140.0 | 139.2 | 138.3 | 137.4 | 136.5 | 135.5 | 134.5 | 133.4 | 132.3 | 131.1 | 129.8 | 128.5 | 127.1 | 47 | |
| | 46 | 140.6 | 139.8 | 139.0 | 138.2 | 137.3 | 136.3 | 135.4 | 134.3 | 133.2 | 132.1 | 130.9 | 129.6 | 128.3 | 126.8 | 125.3 | 46 | |
| 10-28 | 45 | 139.8 | 138.9 | 138.1 | 137.2 | 136.2 | 135.2 | 134.2 | 133.1 | 131.9 | 130.7 | 129.4 | 128.1 | 126.6 | 125.1 | 123.5 | 45 | 1-32 |
| | 44 | 138.8 | 138.0 | 137.0 | 136.1 | 135.1 | 134.0 | 132.9 | 131.8 | 130.5 | 129.2 | 127.9 | 126.4 | 124.9 | 123.3 | 121.6 | 44 | |
| | 43 | 137.9 | 136.9 | 136.0 | 135.0 | 133.9 | 132.8 | 131.6 | 130.4 | 129.1 | 127.7 | 126.3 | 124.8 | 123.1 | 121.4 | 119.6 | 43 | |
| | 42 | 136.9 | 135.9 | 134.9 | 133.8 | 132.7 | 131.5 | 130.2 | 128.9 | 127.6 | 126.1 | 124.6 | 123.0 | 121.3 | 119.5 | 117.6 | 42 | |
| | 41 | 135.8 | 134.8 | 133.7 | 132.6 | 131.4 | 130.1 | 128.8 | 127.4 | 126.0 | 124.4 | 122.8 | 121.1 | 119.3 | 117.4 | 115.4 | 41 | |
| | 49 | 141.6 | 140.9 | 140.3 | 139.5 | 138.7 | 137.9 | 137.1 | 136.2 | 135.3 | 134.3 | 133.3 | 132.3 | 131.1 | 129.9 | 128.7 | 49 | |
| | 48 | 140.9 | 140.1 | 139.4 | 138.6 | 137.8 | 137.0 | 136.1 | 135.1 | 134.1 | 133.1 | 132.1 | 130.9 | 129.7 | 128.5 | 127.1 | 48 | |
| | 47 | 140.0 | 139.3 | 138.5 | 137.7 | 136.8 | 135.9 | 135.0 | 134.0 | 133.0 | 131.9 | 130.7 | 129.5 | 128.2 | 126.9 | 125.5 | 47 | |
| | 46 | 139.2 | 138.4 | 137.6 | 136.7 | 135.8 | 134.8 | 133.9 | 132.8 | 131.7 | 130.5 | 129.3 | 128.0 | 126.7 | 125.3 | 123.8 | 46 | |
| 10-24 | 45 | 138.3 | 137.5 | 136.6 | 135.7 | 134.7 | 133.7 | 132.6 | 131.5 | 130.4 | 129.2 | 127.9 | 126.5 | 125.1 | 123.6 | 122.0 | 45 | 1 36 |
| | 44 | 137.4 | 136.5 | 135.6 | 134.6 | 133.6 | 132.5 | 131.4 | 130.2 | 129.0 | 127.7 | 126.3 | 124.9 | 123.4 | 121.8 | 120.1 | 44 | |
| | 43 | 136.4 | 135.5 | 134.5 | 133.5 | 132.4 | 131.3 | 130.1 | 128.8 | 127.5 | 126.2 | 124.7 | 123.2 | 121.6 | 119.9 | 118.2 | 43 | |
| | 42 | 135.4 | 134.4 | 133.4 | 132.3 | 131.2 | 130.0 | 128.7 | 127.4 | 126.0 | 124.6 | 123.1 | 121.5 | 119.8 | 118.0 | 116.1 | 42 | |
| | 41 | 134.3 | 133.3 | 132.2 | 131.1 | 129.9 | 128.6 | 127.3 | 125.9 | 124.4 | 122.9 | 121.3 | 119.6 | 117.8 | 116.0 | 114.0 | 41 | |
| | 49 | 140.3 | 139.6 | 138.8 | 138.1 | 137.3 | 136.5 | 135.6 | 134.8 | 133.8 | 132.8 | 131.8 | 130.8 | 129.6 | 128.4 | 127.2 | 49 | |
| | 48 | 139.5 | 138.7 | 138.0 | 137.2 | 136.4 | 135.5 | 134.6 | 133.7 | 132.7 | 131.6 | 130.5 | 129.4 | 128.2 | 127.0 | 125.6 | 48 | |
| | 47 | 138.6 | 137.9 | 137.1 | 136.2 | 135.4 | 134.5 | 133.5 | 132.5 | 131.5 | 130.4 | 129.2 | 128.0 | 126.7 | 125.4 | 124.0 | 47 | |
| | 46 | 137.8 | 137.0 | 136.1 | 135.3 | 134.3 | 133.4 | 132.4 | 131.3 | 130.2 | 129.0 | 127.8 | 126.5 | 125.2 | 123.8 | 122.3 | 46 | |
| 10-20 | 45 | 136.9 | 136.0 | 135.2 | 134.2 | 133.2 | 132.2 | 131.2 | 130.1 | 128.9 | 127.6 | 126.4 | 125.0 | 123.6 | 122.1 | 120.5 | 45 | 1-40 |
| | 44 | 136.0 | 135.1 | 134.1 | 133.1 | 132.1 | 131.0 | 129.9 | 128.7 | 127.5 | 126.2 | 124.8 | 123.4 | 121.9 | 120.3 | 118.6 | 44 | |
| | 43 | 135.0 | 134.0 | 133.0 | 132.0 | 130.9 | 129.8 | 128.6 | 127.4 | 126.1 | 124.7 | 123.3 | 121.7 | 120.2 | 118.6 | 116.7 | 43 | |
| | 42 | 134.0 | 133.0 | 131.9 | 130.8 | 129.7 | 128.5 | 127.2 | 125.9 | 124.6 | 123.1 | 121.6 | 120.0 | 118.3 | 116.6 | 114.7 | 42 | |
| | 41 | 132.9 | 131.8 | 130.7 | 129.6 | 128.4 | 127.1 | 125.8 | 124.4 | 123.0 | 121.5 | 119.9 | 118.2 | 116.4 | 114.6 | 112.6 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 148.3 | 147.9 | 147.4 | 147.0 | 146.5 | 146.0 | 145.5 | 145.0 | 144.5 | 143.9 | 143.4 | 142.8 | 142.2 | 141.6 | 140.9 | 49 | |
| | 48 | 147.9 | 147.4 | 147.0 | 146.5 | 146.0 | 145.5 | 145.0 | 144.5 | 143.9 | 143.3 | 142.7 | 142.1 | 141.5 | 140.9 | 140.2 | 48 | |
| | 47 | 147.5 | 147.0 | 146.5 | 146.0 | 145.5 | 145.0 | 144.4 | 143.9 | 143.3 | 142.7 | 142.1 | 141.5 | 140.8 | 140.1 | 139.4 | 47 | |
| | 46 | 147.1 | 146.6 | 146.1 | 145.5 | 145.0 | 144.4 | 143.9 | 143.3 | 142.7 | 142.1 | 141.4 | 140.7 | 140.0 | 139.3 | 138.6 | 46 | |
| 10-20 | 45 | 146.6 | 146.1 | 145.6 | 145.0 | 144.5 | 143.9 | 143.3 | 142.7 | 142.0 | 141.4 | 140.7 | 140.0 | 139.3 | 138.5 | 137.7 | 45 | 1-40 |
| | 44 | 146.1 | 145.6 | 145.0 | 144.5 | 143.9 | 143.3 | 142.7 | 142.0 | 141.4 | 140.7 | 140.0 | 139.2 | 138.4 | 137.6 | 136.8 | 44 | |
| | 43 | 145.6 | 145.1 | 144.5 | 143.9 | 143.3 | 142.7 | 142.0 | 141.4 | 140.7 | 139.9 | 139.2 | 138.4 | 137.6 | 136.8 | 135.9 | 43 | |
| | 42 | 145.1 | 144.6 | 144.0 | 143.3 | 142.7 | 142.0 | 141.4 | 140.6 | 139.9 | 139.1 | 138.4 | 137.6 | 136.7 | 135.8 | 134.9 | 42 | |
| | 41 | 144.6 | 144.0 | 143.4 | 142.7 | 142.1 | 141.4 | 140.7 | 139.9 | 139.1 | 138.4 | 137.5 | 136.7 | 135.8 | 134.9 | 133.9 | 41 | |
| | 49 | 147.1 | 146.7 | 146.2 | 145.8 | 145.3 | 144.8 | 144.3 | 143.8 | 143.2 | 142.7 | 142.1 | 141.5 | 140.9 | 140.2 | 139.6 | 49 | |
| | 48 | 146.7 | 146.3 | 145.8 | 145.3 | 144.8 | 144.3 | 143.7 | 143.2 | 142.6 | 142.1 | 141.4 | 140.8 | 140.2 | 139.5 | 138.8 | 48 | |
| | 47 | 146.3 | 145.8 | 145.3 | 144.8 | 144.3 | 143.8 | 143.2 | 142.6 | 142.0 | 141.4 | 140.8 | 140.1 | 139.5 | 138.8 | 138.0 | 47 | |
| | 46 | 145.9 | 145.4 | 144.8 | 144.3 | 143.8 | 143.2 | 142.6 | 142.0 | 141.4 | 140.8 | 140.1 | 139.4 | 138.7 | 138.0 | 137.2 | 46 | |
| 10-16 | 45 | 145.4 | 144.9 | 144.3 | 143.8 | 143.2 | 142.6 | 142.0 | 141.4 | 140.7 | 140.1 | 139.4 | 138.7 | 137.9 | 137.1 | 136.3 | 45 | 1-44 |
| | 44 | 144.9 | 144.4 | 143.8 | 143.3 | 142.7 | 142.0 | 141.4 | 140.7 | 140.1 | 139.4 | 138.6 | 137.9 | 137.1 | 136.3 | 135.4 | 44 | |
| | 43 | 144.4 | 143.9 | 143.3 | 142.7 | 142.0 | 141.4 | 140.7 | 140.1 | 139.3 | 138.6 | 137.8 | 137.0 | 136.2 | 135.4 | 134.5 | 43 | |
| | 42 | 143.9 | 143.3 | 142.7 | 142.1 | 141.4 | 140.8 | 140.0 | 139.3 | 138.6 | 137.8 | 137.0 | 136.2 | 135.3 | 134.4 | 133.5 | 42 | |
| | 41 | 143.4 | 142.8 | 142.1 | 141.5 | 140.8 | 140.1 | 139.3 | 138.6 | 137.8 | 137.0 | 136.2 | 135.3 | 134.4 | 133.5 | 132.5 | 41 | |
| | 49 | 146.0 | 145.5 | 145.1 | 144.6 | 144.1 | 143.6 | 143.1 | 142.5 | 142.0 | 141.4 | 140.8 | 140.2 | 139.6 | 138.9 | 138.3 | 49 | |
| | 48 | 145.6 | 145.1 | 144.6 | 144.1 | 143.6 | 143.1 | 142.5 | 142.0 | 141.4 | 140.8 | 140.2 | 139.5 | 138.9 | 138.2 | 137.5 | 48 | |
| | 47 | 145.1 | 144.6 | 144.1 | 143.6 | 143.1 | 142.5 | 141.9 | 141.4 | 140.7 | 140.1 | 139.5 | 138.8 | 138.1 | 137.4 | 136.7 | 47 | |
| | 46 | 144.7 | 144.2 | 143.6 | 143.1 | 142.5 | 142.0 | 141.4 | 140.8 | 140.1 | 139.5 | 138.8 | 138.1 | 137.4 | 136.6 | 135.9 | 46 | |
| 10-12 | 45 | 144.2 | 143.7 | 143.1 | 142.6 | 142.0 | 141.4 | 140.8 | 140.1 | 139.5 | 138.8 | 138.1 | 137.3 | 136.6 | 135.8 | 135.0 | 45 | 1-48 |
| | 44 | 143.8 | 143.2 | 142.6 | 142.0 | 141.4 | 140.8 | 140.1 | 139.5 | 138.8 | 138.1 | 137.3 | 136.5 | 135.8 | 134.9 | 134.1 | 44 | |
| | 43 | 143.2 | 142.7 | 142.1 | 141.4 | 140.8 | 140.1 | 139.5 | 138.8 | 138.0 | 137.3 | 136.5 | 135.7 | 134.9 | 134.0 | 133.1 | 43 | |
| | 42 | 142.7 | 142.1 | 141.5 | 140.8 | 140.2 | 139.5 | 138.8 | 138.0 | 137.3 | 136.5 | 135.7 | 134.9 | 134.0 | 133.1 | 132.1 | 42 | |
| | 41 | 142.2 | 141.5 | 140.9 | 140.2 | 139.5 | 138.8 | 138.1 | 137.3 | 136.5 | 135.7 | 134.8 | 134.0 | 133.1 | 132.1 | 131.1 | 41 | |
| | 49 | 144.8 | 144.4 | 143.9 | 143.4 | 142.9 | 142.4 | 141.9 | 141.3 | 140.7 | 140.1 | 139.5 | 138.9 | 138.3 | 137.6 | 137.0 | 49 | |
| | 48 | 144.4 | 143.9 | 143.4 | 142.9 | 142.4 | 141.9 | 141.3 | 140.7 | 140.1 | 139.5 | 138.9 | 138.3 | 137.6 | 136.9 | 136.2 | 48 | |
| | 47 | 144.0 | 143.5 | 142.9 | 142.4 | 141.9 | 141.3 | 140.7 | 140.1 | 139.5 | 138.9 | 138.2 | 137.6 | 136.9 | 136.1 | 135.4 | 47 | |
| | 46 | 143.5 | 143.0 | 142.5 | 141.9 | 141.3 | 140.7 | 140.1 | 139.5 | 138.9 | 138.2 | 137.5 | 136.8 | 136.1 | 135.3 | 134.6 | 46 | |
| 10-08 | 45 | 143.1 | 142.5 | 142.0 | 141.4 | 140.8 | 140.2 | 139.5 | 138.9 | 138.2 | 137.5 | 136.8 | 136.0 | 135.3 | 134.5 | 133.7 | 45 | 1-52 |
| | 44 | 142.6 | 142.0 | 141.4 | 140.8 | 140.2 | 139.6 | 138.9 | 138.2 | 137.5 | 136.8 | 136.0 | 135.2 | 134.5 | 133.6 | 132.8 | 44 | |
| | 43 | 142.1 | 141.5 | 140.8 | 140.2 | 139.6 | 138.9 | 138.2 | 137.5 | 136.8 | 136.0 | 135.2 | 134.4 | 133.6 | 132.7 | 131.8 | 43 | |
| | 42 | 141.5 | 140.9 | 140.3 | 139.6 | 138.9 | 138.2 | 137.5 | 136.8 | 136.0 | 135.2 | 134.4 | 133.6 | 132.7 | 131.8 | 130.8 | 42 | |
| | 41 | 141.0 | 140.3 | 139.7 | 139.0 | 138.3 | 137.6 | 136.8 | 136.0 | 135.2 | 134.4 | 133.5 | 132.7 | 131.7 | 130.8 | 129.8 | 41 | |
| | 49 | 143.7 | 143.2 | 142.7 | 142.2 | 141.7 | 141.2 | 140.7 | 140.1 | 139.5 | 138.9 | 138.3 | 137.7 | 137.0 | 136.4 | 135.7 | 49 | |
| | 48 | 143.3 | 142.8 | 142.3 | 141.8 | 141.2 | 140.7 | 140.1 | 139.5 | 138.9 | 138.3 | 137.7 | 137.0 | 136.3 | 135.6 | 134.9 | 48 | |
| | 47 | 142.8 | 142.3 | 141.8 | 141.2 | 140.7 | 140.1 | 139.5 | 138.9 | 138.3 | 137.6 | 137.0 | 136.3 | 135.6 | 134.9 | 134.1 | 47 | |
| | 46 | 142.4 | 141.9 | 141.3 | 140.8 | 140.1 | 139.5 | 138.9 | 138.3 | 137.6 | 137.0 | 136.3 | 135.6 | 134.8 | 134.1 | 133.3 | 46 | |
| 10-04 | 45 | 141.9 | 141.3 | 140.8 | 140.2 | 139.6 | 139.0 | 138.3 | 137.6 | 137.0 | 136.3 | 135.5 | 134.8 | 134.0 | 133.2 | 132.4 | 45 | 1-56 |
| | 44 | 141.4 | 140.8 | 140.2 | 139.6 | 139.0 | 138.3 | 137.7 | 137.0 | 136.3 | 135.5 | 134.8 | 134.0 | 133.2 | 132.3 | 131.5 | 44 | |
| | 43 | 140.9 | 140.3 | 139.7 | 139.0 | 138.4 | 137.7 | 137.0 | 136.3 | 135.5 | 134.8 | 134.0 | 133.1 | 132.3 | 131.4 | 130.5 | 43 | |
| | 42 | 140.4 | 139.7 | 139.1 | 138.4 | 137.7 | 137.0 | 136.3 | 135.5 | 134.8 | 134.0 | 133.1 | 132.3 | 131.4 | 130.5 | 129.5 | 42 | |
| | 41 | 139.8 | 139.2 | 138.5 | 137.8 | 137.1 | 136.3 | 135.6 | 134.8 | 134.0 | 133.1 | 132.2 | 131.4 | 130.5 | 129.5 | 128.5 | 41 | |
| | 49 | 142.6 | 142.1 | 141.6 | 141.1 | 140.6 | 140.0 | 139.5 | 138.9 | 138.3 | 137.7 | 137.1 | 136.5 | 135.8 | 135.1 | 134.4 | 49 | |
| | 48 | 142.2 | 141.7 | 141.1 | 140.6 | 140.1 | 139.5 | 138.9 | 138.3 | 137.7 | 137.1 | 136.4 | 135.8 | 135.1 | 134.4 | 133.6 | 48 | |
| | 47 | 141.7 | 141.2 | 140.6 | 140.1 | 139.5 | 138.9 | 138.3 | 137.7 | 137.1 | 136.4 | 135.7 | 135.1 | 134.3 | 133.6 | 132.8 | 47 | |
| | 46 | 141.3 | 140.7 | 140.1 | 139.6 | 139.0 | 138.4 | 137.7 | 137.1 | 136.4 | 135.7 | 135.0 | 134.3 | 133.6 | 132.8 | 132.0 | 46 | |
| 10-00 | 45 | 140.8 | 140.2 | 139.6 | 139.0 | 138.4 | 137.8 | 137.1 | 136.4 | 135.7 | 135.0 | 134.3 | 133.5 | 132.8 | 131.9 | 131.1 | 45 | 2-00 |
| | 44 | 140.3 | 139.7 | 139.1 | 138.4 | 137.8 | 137.1 | 136.5 | 135.8 | 135.0 | 134.3 | 133.5 | 132.7 | 131.9 | 131.1 | 130.2 | 44 | |
| | 43 | 139.8 | 139.1 | 138.5 | 137.9 | 137.2 | 136.5 | 135.8 | 135.1 | 134.3 | 133.5 | 132.7 | 131.9 | 131.0 | 130.2 | 129.2 | 43 | |
| | 42 | 139.2 | 138.6 | 137.9 | 137.2 | 136.5 | 135.8 | 135.1 | 134.3 | 133.5 | 132.7 | 131.9 | 131.0 | 130.1 | 129.2 | 128.3 | 42 | |
| | 41 | 138.7 | 138.0 | 137.3 | 136.6 | 135.9 | 135.1 | 134.4 | 133.6 | 132.8 | 131.9 | 131.0 | 130.1 | 129.2 | 128.2 | 127.2 | 41 | |
| | 49 | 141.5 | 141.0 | 140.5 | 139.9 | 139.4 | 138.9 | 138.3 | 137.7 | 137.1 | 136.5 | 135.9 | 135.2 | 134.6 | 133.9 | 133.2 | 49 | |
| | 48 | 141.1 | 140.5 | 140.0 | 139.5 | 138.9 | 138.3 | 137.7 | 137.1 | 136.5 | 135.9 | 135.2 | 134.6 | 133.9 | 133.1 | 132.4 | 48 | |
| | 47 | 140.6 | 140.1 | 139.5 | 138.9 | 138.4 | 137.8 | 137.1 | 136.5 | 135.9 | 135.2 | 134.5 | 133.8 | 133.1 | 132.4 | 131.6 | 47 | |
| | 46 | 140.1 | 139.6 | 139.0 | 138.4 | 137.8 | 137.2 | 136.5 | 135.9 | 135.2 | 134.5 | 133.8 | 133.1 | 132.3 | 131.5 | 130.7 | 46 | |
| 9-56 | 45 | 139.7 | 139.1 | 138.5 | 137.8 | 137.2 | 136.6 | 135.9 | 135.2 | 134.5 | 133.8 | 133.1 | 132.3 | 131.5 | 130.7 | 129.8 | 45 | 2-04 |
| | 44 | 139.1 | 138.6 | 137.9 | 137.3 | 136.6 | 136.0 | 135.3 | 134.6 | 133.8 | 133.1 | 132.3 | 131.5 | 130.7 | 129.8 | 128.9 | 44 | |
| | 43 | 138.6 | 138.0 | 137.3 | 136.7 | 136.0 | 135.3 | 134.6 | 133.9 | 133.1 | 132.3 | 131.5 | 130.7 | 129.8 | 128.9 | 128.0 | 43 | |
| | 42 | 138.1 | 137.4 | 136.8 | 136.1 | 135.4 | 134.6 | 133.9 | 133.1 | 132.3 | 131.5 | 130.7 | 129.8 | 128.9 | 128.0 | 127.0 | 42 | |
| | 41 | 137.5 | 136.8 | 136.2 | 135.4 | 134.7 | 133.9 | 133.2 | 132.4 | 131.5 | 130.7 | 129.8 | 128.9 | 128.0 | 127.0 | 126.0 | 41 | |
| | 49 | 140.4 | 139.9 | 139.4 | 138.8 | 138.3 | 137.7 | 137.2 | 136.6 | 136.0 | 135.3 | 134.7 | 134.0 | 133.4 | 132.7 | 132.0 | 49 | |
| | 48 | 140.0 | 139.4 | 138.9 | 138.3 | 137.8 | 137.2 | 136.6 | 136.0 | 135.4 | 134.7 | 134.0 | 133.4 | 132.7 | 131.9 | 131.2 | 48 | |
| | 47 | 139.5 | 139.0 | 138.4 | 137.8 | 137.2 | 136.6 | 136.0 | 135.4 | 134.7 | 134.0 | 133.3 | 132.6 | 131.9 | 131.1 | 130.4 | 47 | |
| | 46 | 139.0 | 138.5 | 137.9 | 137.3 | 136.7 | 136.0 | 135.4 | 134.7 | 134.0 | 133.3 | 132.6 | 131.9 | 131.1 | 130.3 | 129.5 | 46 | |
| 9-52 | 45 | 138.5 | 137.9 | 137.3 | 136.7 | 136.1 | 135.5 | 134.8 | 134.1 | 133.3 | 132.6 | 131.9 | 131.1 | 130.3 | 129.5 | 128.6 | 45 | 2-08 |
| | 44 | 138.0 | 137.4 | 136.8 | 136.1 | 135.5 | 134.8 | 134.1 | 133.4 | 132.6 | 131.9 | 131.1 | 130.3 | 129.5 | 128.6 | 127.7 | 44 | |
| | 43 | 137.5 | 136.9 | 136.2 | 135.5 | 134.8 | 134.1 | 133.4 | 132.7 | 131.9 | 131.1 | 130.3 | 129.5 | 128.6 | 127.7 | 126.8 | 43 | |
| | 42 | 137.0 | 136.3 | 135.6 | 134.9 | 134.2 | 133.5 | 132.7 | 132.0 | 131.2 | 130.3 | 129.5 | 128.6 | 127.7 | 126.8 | 125.8 | 42 | |
| | 41 | 136.4 | 135.7 | 135.0 | 134.3 | 133.5 | 132.8 | 132.0 | 131.2 | 130.4 | 129.5 | 128.6 | 127.7 | 126.8 | 125.8 | 124.8 | 41 | |
| | 49 | 139.3 | 138.8 | 138.3 | 137.7 | 137.2 | 136.6 | 136.0 | 135.4 | 134.8 | 134.2 | 133.5 | 132.9 | 132.2 | 131.5 | 130.8 | 49 | |
| | 48 | 138.9 | 138.3 | 137.8 | 137.2 | 136.6 | 136.0 | 135.4 | 134.8 | 134.2 | 133.5 | 132.9 | 132.2 | 131.5 | 130.7 | 130.0 | 48 | |
| | 47 | 138.4 | 137.9 | 137.3 | 136.7 | 136.1 | 135.5 | 134.9 | 134.2 | 133.5 | 132.9 | 132.2 | 131.4 | 130.7 | 129.9 | 129.1 | 47 | |
| | 46 | 137.9 | 137.4 | 136.8 | 136.2 | 135.5 | 134.9 | 134.2 | 133.6 | 132.9 | 132.2 | 131.4 | 130.7 | 129.9 | 129.1 | 128.3 | 46 | |
| 9-48 | 45 | 137.4 | 136.8 | 136.3 | 135.7 | 135.0 | 134.4 | 133.7 | 133.0 | 132.2 | 131.5 | 130.7 | 129.9 | 129.1 | 128.3 | 127.4 | 45 | 2-12 |
| | 44 | 136.9 | 136.3 | 135.7 | 135.0 | 134.4 | 133.7 | 133.0 | 132.2 | 131.5 | 130.7 | 129.9 | 129.1 | 128.3 | 127.4 | 126.5 | 44 | |
| | 43 | 136.4 | 135.8 | 135.1 | 134.4 | 133.7 | 133.0 | 132.3 | 131.5 | 130.7 | 130.0 | 129.1 | 128.3 | 127.4 | 126.5 | 125.6 | 43 | |
| | 42 | 135.9 | 135.2 | 134.5 | 133.8 | 133.1 | 132.3 | 131.6 | 130.8 | 130.0 | 129.2 | 128.3 | 127.4 | 126.5 | 125.6 | 124.6 | 42 | |
| | 41 | 135.3 | 134.6 | 133.9 | 133.2 | 132.4 | 131.6 | 130.8 | 130.0 | 129.2 | 128.3 | 127.5 | 126.5 | 125.6 | 124.6 | 123.6 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 140.3 | 139.6 | 138.8 | 138.1 | 137.3 | 136.5 | 135.6 | 134.8 | 133.8 | 132.8 | 131.8 | 130.8 | 129.6 | 128.4 | 127.2 | 49 | |
| | 48 | 139.5 | 138.7 | 138.0 | 137.2 | 136.4 | 135.5 | 134.6 | 133.7 | 132.7 | 131.6 | 130.5 | 129.4 | 128.2 | 127.0 | 125.6 | 48 | |
| | 47 | 138.6 | 137.9 | 137.1 | 136.2 | 135.4 | 134.5 | 133.5 | 132.5 | 131.5 | 130.4 | 129.2 | 128.0 | 126.7 | 125.4 | 124.0 | 47 | |
| | 46 | 137.8 | 137.0 | 136.1 | 135.3 | 134.3 | 133.4 | 132.4 | 131.3 | 130.2 | 129.0 | 127.8 | 126.5 | 125.2 | 123.8 | 122.3 | 46 | |
| 10-20 | 45 | 136.9 | 136.0 | 135.2 | 134.2 | 133.2 | 132.2 | 131.2 | 130.1 | 128.9 | 127.6 | 126.4 | 125.0 | 123.6 | 122.1 | 120.5 | 45 | 1-40 |
| | 44 | 136.0 | 135.1 | 134.1 | 133.1 | 132.1 | 131.0 | 129.9 | 128.7 | 127.5 | 126.2 | 124.8 | 123.4 | 121.9 | 120.3 | 118.6 | 44 | |
| | 43 | 135.0 | 134.0 | 133.0 | 132.0 | 130.9 | 129.8 | 128.6 | 127.4 | 126.1 | 124.7 | 123.3 | 121.7 | 120.2 | 118.5 | 116.7 | 43 | |
| | 42 | 134.0 | 133.0 | 131.9 | 130.8 | 129.7 | 128.5 | 127.2 | 125.9 | 124.6 | 123.1 | 121.6 | 120.0 | 118.3 | 116.6 | 114.7 | 42 | |
| | 41 | 132.9 | 131.8 | 130.7 | 129.6 | 128.4 | 127.1 | 125.8 | 124.4 | 123.0 | 121.5 | 119.9 | 118.2 | 116.4 | 114.6 | 112.6 | 41 | |
| | 49 | 138.9 | 138.2 | 137.5 | 136.7 | 135.9 | 135.1 | 134.2 | 133.3 | 132.4 | 131.4 | 130.3 | 129.3 | 128.1 | 126.9 | 125.7 | 49 | |
| | 48 | 138.1 | 137.4 | 136.6 | 135.8 | 135.0 | 134.1 | 133.2 | 132.2 | 131.2 | 130.2 | 129.1 | 127.9 | 126.7 | 125.5 | 124.1 | 48 | |
| | 47 | 137.3 | 136.5 | 135.7 | 134.8 | 133.9 | 133.0 | 132.1 | 131.1 | 130.0 | 128.9 | 127.7 | 126.5 | 125.3 | 123.9 | 122.5 | 47 | |
| | 46 | 136.5 | 135.6 | 134.7 | 133.8 | 132.9 | 131.9 | 130.9 | 129.8 | 128.8 | 127.6 | 126.4 | 125.1 | 123.7 | 122.3 | 120.8 | 46 | |
| 10-16 | 45 | 135.5 | 134.6 | 133.7 | 132.8 | 131.8 | 130.8 | 129.7 | 128.6 | 127.4 | 126.2 | 124.9 | 123.5 | 122.1 | 120.6 | 119.1 | 45 | 1-44 |
| | 44 | 134.6 | 133.7 | 132.7 | 131.7 | 130.7 | 129.6 | 128.5 | 127.3 | 126.1 | 124.7 | 123.4 | 122.0 | 120.5 | 118.9 | 117.2 | 44 | |
| | 43 | 133.6 | 132.6 | 131.6 | 130.6 | 129.5 | 128.4 | 127.2 | 125.9 | 124.6 | 123.2 | 121.8 | 120.3 | 118.7 | 117.1 | 115.3 | 43 | |
| | 42 | 132.6 | 131.5 | 130.5 | 129.4 | 128.3 | 127.1 | 125.8 | 124.5 | 123.1 | 121.7 | 120.2 | 118.6 | 116.9 | 115.2 | 113.4 | 42 | |
| | 41 | 131.5 | 130.4 | 129.3 | 128.2 | 127.0 | 125.7 | 124.4 | 123.0 | 121.6 | 120.1 | 118.5 | 116.8 | 115.1 | 113.3 | 111.3 | 41 | |
| | 49 | 137.6 | 136.8 | 136.1 | 135.3 | 134.5 | 133.7 | 132.8 | 131.9 | 130.9 | 130.0 | 128.9 | 127.8 | 126.7 | 125.5 | 124.2 | 49 | |
| | 48 | 136.8 | 136.0 | 135.2 | 134.4 | 133.6 | 132.7 | 131.8 | 130.8 | 129.8 | 128.7 | 127.6 | 126.5 | 125.3 | 124.0 | 122.7 | 48 | |
| | 47 | 135.9 | 135.1 | 134.3 | 133.4 | 132.6 | 131.6 | 130.7 | 129.6 | 128.6 | 127.5 | 126.3 | 125.1 | 123.8 | 122.5 | 121.1 | 47 | |
| | 46 | 135.1 | 134.2 | 133.4 | 132.4 | 131.5 | 130.5 | 129.5 | 128.4 | 127.3 | 126.1 | 124.9 | 123.6 | 122.3 | 120.9 | 119.4 | 46 | |
| 10-12 | 45 | 134.1 | 133.3 | 132.4 | 131.4 | 130.4 | 129.4 | 128.3 | 127.2 | 126.0 | 124.8 | 123.5 | 122.1 | 120.7 | 119.2 | 117.7 | 45 | 1-48 |
| | 44 | 133.2 | 132.3 | 131.3 | 130.3 | 129.3 | 128.2 | 127.1 | 125.9 | 124.6 | 123.3 | 122.0 | 120.6 | 119.1 | 117.5 | 115.9 | 44 | |
| | 43 | 132.2 | 131.2 | 130.2 | 129.2 | 128.1 | 127.0 | 125.8 | 124.5 | 123.2 | 121.9 | 120.4 | 118.9 | 117.4 | 115.7 | 114.0 | 43 | |
| | 42 | 131.2 | 130.2 | 129.1 | 128.0 | 126.9 | 125.7 | 124.4 | 123.1 | 121.7 | 120.3 | 118.8 | 117.2 | 115.6 | 113.9 | 112.1 | 42 | |
| | 41 | 130.1 | 129.0 | 127.9 | 126.8 | 125.6 | 124.3 | 123.0 | 121.6 | 120.2 | 118.7 | 117.1 | 115.5 | 113.8 | 112.0 | 110.1 | 41 | |
| | 49 | 136.3 | 135.5 | 134.8 | 134.0 | 133.2 | 132.3 | 131.5 | 130.5 | 129.6 | 128.6 | 127.5 | 126.4 | 125.3 | 124.1 | 122.8 | 49 | |
| | 48 | 135.5 | 134.7 | 133.9 | 133.1 | 132.2 | 131.3 | 130.4 | 129.4 | 128.4 | 127.3 | 126.2 | 125.1 | 123.9 | 122.6 | 121.3 | 48 | |
| | 47 | 134.6 | 133.8 | 133.0 | 132.1 | 131.2 | 130.2 | 129.3 | 128.3 | 127.2 | 126.1 | 124.9 | 123.7 | 122.4 | 121.1 | 119.7 | 47 | |
| | 46 | 133.8 | 132.9 | 132.0 | 131.1 | 130.1 | 129.1 | 128.1 | 127.0 | 125.9 | 124.8 | 123.5 | 122.3 | 120.9 | 119.5 | 118.0 | 46 | |
| 10-08 | 45 | 132.8 | 131.9 | 131.0 | 130.0 | 129.1 | 128.0 | 126.9 | 125.8 | 124.6 | 123.4 | 122.1 | 120.8 | 119.4 | 117.9 | 116.3 | 45 | 1-52 |
| | 44 | 131.9 | 130.9 | 130.0 | 129.0 | 127.9 | 126.8 | 125.7 | 124.5 | 123.3 | 122.0 | 120.6 | 119.2 | 117.7 | 116.2 | 114.6 | 44 | |
| | 43 | 130.9 | 129.9 | 128.9 | 127.8 | 126.7 | 125.6 | 124.4 | 123.2 | 121.9 | 120.5 | 119.1 | 117.6 | 116.1 | 114.4 | 112.7 | 43 | |
| | 42 | 129.9 | 128.8 | 127.8 | 126.7 | 125.5 | 124.3 | 123.1 | 121.8 | 120.4 | 119.0 | 117.5 | 115.9 | 114.3 | 112.6 | 110.9 | 42 | |
| | 41 | 128.8 | 127.7 | 126.6 | 125.4 | 124.2 | 123.0 | 121.7 | 120.3 | 118.9 | 117.4 | 115.8 | 114.2 | 112.5 | 110.8 | 108.9 | 41 | |
| | 49 | 135.0 | 134.2 | 133.5 | 132.7 | 131.9 | 131.0 | 130.1 | 129.2 | 128.2 | 127.2 | 126.1 | 125.1 | 123.9 | 122.7 | 121.4 | 49 | |
| | 48 | 134.2 | 133.4 | 132.6 | 131.8 | 130.9 | 130.0 | 129.1 | 128.1 | 127.1 | 126.0 | 124.9 | 123.7 | 122.5 | 121.2 | 119.9 | 48 | |
| | 47 | 133.3 | 132.5 | 131.7 | 130.8 | 129.9 | 128.9 | 128.0 | 126.9 | 125.9 | 124.7 | 123.6 | 122.3 | 121.1 | 119.7 | 118.4 | 47 | |
| | 46 | 132.5 | 131.6 | 130.7 | 129.8 | 128.8 | 127.8 | 126.8 | 125.7 | 124.6 | 123.4 | 122.2 | 120.9 | 119.6 | 118.2 | 116.7 | 46 | |
| 10-04 | 45 | 131.5 | 130.6 | 129.7 | 128.7 | 127.7 | 126.7 | 125.6 | 124.5 | 123.3 | 122.1 | 120.8 | 119.4 | 118.0 | 116.6 | 115.0 | 45 | 1-56 |
| | 44 | 130.6 | 129.6 | 128.6 | 127.6 | 126.6 | 125.5 | 124.4 | 123.2 | 121.9 | 120.7 | 119.3 | 117.9 | 116.4 | 114.9 | 113.3 | 44 | |
| | 43 | 129.6 | 128.6 | 127.6 | 126.5 | 125.4 | 124.3 | 123.1 | 121.8 | 120.6 | 119.2 | 117.8 | 116.3 | 114.8 | 113.2 | 111.5 | 43 | |
| | 42 | 128.6 | 127.5 | 126.4 | 125.3 | 124.2 | 123.0 | 121.8 | 120.5 | 119.1 | 117.7 | 116.2 | 114.7 | 113.1 | 111.4 | 109.7 | 42 | |
| | 41 | 127.5 | 126.4 | 125.3 | 124.1 | 122.9 | 121.7 | 120.4 | 119.0 | 117.6 | 116.1 | 114.6 | 113.0 | 111.3 | 109.6 | 107.8 | 41 | |
| | 49 | 133.7 | 133.0 | 132.2 | 131.4 | 130.6 | 129.7 | 128.8 | 127.9 | 126.9 | 125.9 | 124.8 | 123.7 | 122.6 | 121.4 | 120.1 | 49 | |
| | 48 | 132.9 | 132.1 | 131.3 | 130.5 | 129.6 | 128.7 | 127.7 | 126.7 | 125.7 | 124.7 | 123.6 | 122.4 | 121.2 | 119.9 | 118.6 | 48 | |
| | 47 | 132.0 | 131.2 | 130.4 | 129.5 | 128.6 | 127.6 | 126.6 | 125.6 | 124.5 | 123.4 | 122.2 | 121.0 | 119.8 | 118.4 | 117.1 | 47 | |
| | 46 | 131.2 | 130.3 | 129.4 | 128.5 | 127.5 | 126.5 | 125.5 | 124.4 | 123.3 | 122.1 | 120.9 | 119.6 | 118.3 | 116.9 | 115.4 | 46 | |
| 10-00 | 45 | 130.2 | 129.3 | 128.4 | 127.4 | 126.4 | 125.4 | 124.3 | 123.2 | 122.0 | 120.8 | 119.5 | 118.1 | 116.7 | 115.3 | 113.8 | 45 | 2-00 |
| | 44 | 129.3 | 128.3 | 127.4 | 126.4 | 125.3 | 124.2 | 123.1 | 121.9 | 120.7 | 119.4 | 118.0 | 116.6 | 115.2 | 113.7 | 112.1 | 44 | |
| | 43 | 128.3 | 127.3 | 126.3 | 125.2 | 124.1 | 123.0 | 121.8 | 120.6 | 119.3 | 117.9 | 116.5 | 115.1 | 113.6 | 112.0 | 110.3 | 43 | |
| | 42 | 127.3 | 126.2 | 125.2 | 124.1 | 122.9 | 121.7 | 120.5 | 119.2 | 117.8 | 116.4 | 115.0 | 113.5 | 111.9 | 110.2 | 108.5 | 42 | |
| | 41 | 126.2 | 125.1 | 124.0 | 122.9 | 121.7 | 120.4 | 119.1 | 117.8 | 116.4 | 114.9 | 113.4 | 111.8 | 110.2 | 108.5 | 106.7 | 41 | |
| | 49 | 132.5 | 131.7 | 130.9 | 130.1 | 129.3 | 128.4 | 127.5 | 126.6 | 125.6 | 124.6 | 123.5 | 122.4 | 121.3 | 120.1 | 118.8 | 49 | |
| | 48 | 131.6 | 130.8 | 130.0 | 129.2 | 128.3 | 127.4 | 126.4 | 125.5 | 124.4 | 123.4 | 122.3 | 121.1 | 119.9 | 118.7 | 117.3 | 48 | |
| | 47 | 130.8 | 129.9 | 129.1 | 128.2 | 127.3 | 126.3 | 125.4 | 124.3 | 123.2 | 122.1 | 121.0 | 119.7 | 118.5 | 117.2 | 115.8 | 47 | |
| | 46 | 129.9 | 129.0 | 128.1 | 127.2 | 126.2 | 125.2 | 124.2 | 123.1 | 122.0 | 120.8 | 119.6 | 118.3 | 117.0 | 115.6 | 114.2 | 46 | |
| 9-56 | 45 | 129.0 | 128.1 | 127.1 | 126.2 | 125.2 | 124.1 | 123.0 | 121.9 | 120.7 | 119.5 | 118.2 | 116.9 | 115.5 | 114.1 | 112.6 | 45 | 2-04 |
| | 44 | 128.0 | 127.1 | 126.1 | 125.1 | 124.0 | 122.9 | 121.8 | 120.6 | 119.4 | 118.1 | 116.8 | 115.4 | 114.0 | 112.5 | 110.9 | 44 | |
| | 43 | 127.0 | 126.1 | 125.0 | 124.0 | 122.9 | 121.7 | 120.5 | 119.3 | 118.0 | 116.7 | 115.3 | 113.9 | 112.4 | 110.8 | 109.2 | 43 | |
| | 42 | 126.0 | 125.0 | 123.9 | 122.8 | 121.7 | 120.5 | 119.2 | 118.0 | 116.6 | 115.2 | 113.8 | 112.3 | 110.7 | 109.1 | 107.4 | 42 | |
| | 41 | 125.0 | 123.9 | 122.8 | 121.6 | 120.4 | 119.2 | 117.9 | 116.6 | 115.2 | 113.7 | 112.2 | 110.7 | 109.0 | 107.4 | 105.6 | 41 | |
| | 49 | 131.2 | 130.5 | 129.7 | 128.9 | 128.0 | 127.1 | 126.2 | 125.3 | 124.3 | 123.3 | 122.2 | 121.1 | 120.0 | 118.8 | 117.5 | 49 | |
| | 48 | 130.4 | 129.6 | 128.8 | 127.9 | 127.0 | 126.1 | 125.2 | 124.2 | 123.2 | 122.1 | 121.0 | 119.8 | 118.6 | 117.4 | 116.1 | 48 | |
| | 47 | 129.6 | 128.7 | 127.8 | 126.9 | 126.0 | 125.1 | 124.1 | 123.0 | 122.0 | 120.9 | 119.7 | 118.5 | 117.2 | 115.9 | 114.6 | 47 | |
| | 46 | 128.7 | 127.8 | 126.9 | 126.0 | 125.0 | 124.0 | 122.9 | 121.9 | 120.8 | 119.6 | 118.4 | 117.1 | 115.8 | 114.4 | 113.0 | 46 | |
| 9-52 | 45 | 127.7 | 126.8 | 125.9 | 124.9 | 123.9 | 122.9 | 121.8 | 120.6 | 119.5 | 118.3 | 117.0 | 115.7 | 114.3 | 112.9 | 111.4 | 45 | 2-08 |
| | 44 | 126.8 | 125.9 | 124.9 | 123.8 | 122.8 | 121.7 | 120.6 | 119.4 | 118.2 | 116.9 | 115.6 | 114.2 | 112.8 | 111.3 | 109.8 | 44 | |
| | 43 | 125.8 | 124.8 | 123.8 | 122.8 | 121.7 | 120.5 | 119.3 | 118.1 | 116.8 | 115.5 | 114.1 | 112.7 | 111.2 | 109.7 | 108.1 | 43 | |
| | 42 | 124.8 | 123.8 | 122.7 | 121.6 | 120.5 | 119.3 | 118.0 | 116.8 | 115.4 | 114.1 | 112.6 | 111.1 | 109.6 | 108.0 | 106.4 | 42 | |
| | 41 | 123.8 | 122.7 | 121.6 | 120.4 | 119.2 | 118.0 | 116.7 | 115.4 | 114.0 | 112.6 | 111.1 | 109.6 | 108.0 | 106.3 | 104.6 | 41 | |
| | 49 | 130.0 | 129.2 | 128.4 | 127.6 | 126.8 | 125.9 | 125.0 | 124.0 | 123.1 | 122.0 | 121.0 | 119.9 | 118.7 | 117.6 | 116.3 | 49 | |
| | 48 | 129.2 | 128.4 | 127.6 | 126.7 | 125.8 | 124.9 | 123.9 | 122.9 | 121.9 | 120.9 | 119.7 | 118.6 | 117.4 | 116.2 | 114.9 | 48 | |
| | 47 | 128.3 | 127.5 | 126.6 | 125.7 | 124.8 | 123.8 | 122.8 | 121.8 | 120.8 | 119.6 | 118.5 | 117.3 | 116.0 | 114.7 | 113.4 | 47 | |
| | 46 | 127.5 | 126.6 | 125.7 | 124.7 | 123.8 | 122.7 | 121.7 | 120.6 | 119.5 | 118.4 | 117.2 | 115.9 | 114.6 | 113.2 | 111.8 | 46 | |
| 9-48 | 45 | 126.5 | 125.6 | 124.7 | 123.7 | 122.7 | 121.6 | 120.6 | 119.4 | 118.3 | 117.1 | 115.8 | 114.5 | 113.1 | 111.7 | 110.3 | 45 | 2-12 |
| | 44 | 125.6 | 124.7 | 123.7 | 122.6 | 121.6 | 120.5 | 119.4 | 118.2 | 117.0 | 115.7 | 114.4 | 113.1 | 111.6 | 110.2 | 108.7 | 44 | |
| | 43 | 124.6 | 123.6 | 122.6 | 121.6 | 120.5 | 119.3 | 118.1 | 116.9 | 115.7 | 114.3 | 113.0 | 111.6 | 110.1 | 108.6 | 107.0 | 43 | |
| | 42 | 123.6 | 122.6 | 121.5 | 120.4 | 119.3 | 118.1 | 116.9 | 115.6 | 114.3 | 112.9 | 111.5 | 110.0 | 108.5 | 107.0 | 105.3 | 42 | |
| | 41 | 122.6 | 121.5 | 120.4 | 119.3 | 118.1 | 116.8 | 115.6 | 114.3 | 112.9 | 111.5 | 110.0 | 108.5 | 106.9 | 105.3 | 103.6 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

9 hrs. 48 m. to 9 hrs. 16 m. 2 hrs. 12 m. to 2 hrs. 44 m.

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 139.3 | 138.8 | 138.3 | 137.7 | 137.2 | 136.6 | 136.0 | 135.4 | 134.8 | 134.2 | 133.5 | 132.9 | 132.2 | 131.5 | 130.8 | 49 | |
| | 48 | 138.9 | 138.3 | 137.8 | 137.2 | 136.6 | 136.0 | 135.4 | 134.8 | 134.2 | 133.5 | 132.9 | 132.2 | 131.5 | 130.7 | 130.0 | 48 | |
| | 47 | 138.4 | 137.9 | 137.3 | 136.7 | 136.1 | 135.5 | 134.9 | 134.2 | 133.5 | 132.9 | 132.2 | 131.4 | 130.7 | 129.9 | 129.1 | 47 | |
| | 46 | 137.9 | 137.4 | 136.8 | 136.2 | 135.5 | 134.9 | 134.2 | 133.6 | 132.9 | 132.2 | 131.4 | 130.7 | 129.9 | 129.1 | 128.3 | 46 | |
| 9-48 | 45 | 137.4 | 136.8 | 136.2 | 135.6 | 135.0 | 134.3 | 133.6 | 132.9 | 132.2 | 131.5 | 130.7 | 129.9 | 129.1 | 128.3 | 127.4 | 45 | 2-12 |
| | 44 | 136.9 | 136.3 | 135.7 | 135.0 | 134.4 | 133.7 | 133.0 | 132.2 | 131.5 | 130.7 | 129.9 | 129.1 | 128.3 | 127.4 | 126.5 | 44 | |
| | 43 | 136.4 | 135.8 | 135.1 | 134.4 | 133.7 | 133.0 | 132.3 | 131.5 | 130.7 | 130.0 | 129.1 | 128.3 | 127.4 | 126.5 | 125.6 | 43 | |
| | 42 | 135.9 | 135.2 | 134.5 | 133.8 | 133.1 | 132.3 | 131.6 | 130.8 | 130.0 | 129.2 | 128.3 | 127.4 | 126.5 | 125.6 | 124.6 | 42 | |
| | 41 | 135.3 | 134.6 | 133.9 | 133.2 | 132.4 | 131.6 | 130.8 | 130.0 | 129.2 | 128.3 | 127.5 | 126.5 | 125.6 | 124.6 | 123.6 | 41 | |
| | 49 | 138.2 | 137.7 | 137.2 | 136.6 | 136.0 | 135.5 | 134.9 | 134.3 | 133.7 | 133.0 | 132.4 | 131.7 | 131.0 | 130.3 | 129.6 | 49 | |
| | 48 | 137.8 | 137.2 | 136.7 | 136.1 | 135.5 | 134.9 | 134.3 | 133.7 | 133.0 | 132.4 | 131.7 | 131.0 | 130.3 | 129.5 | 128.8 | 48 | |
| | 47 | 137.3 | 136.8 | 136.2 | 135.6 | 135.0 | 134.4 | 133.7 | 133.1 | 132.4 | 131.7 | 131.0 | 130.3 | 129.5 | 128.8 | 128.0 | 47 | |
| | 46 | 136.8 | 136.3 | 135.7 | 135.1 | 134.4 | 133.8 | 133.1 | 132.4 | 131.7 | 131.0 | 130.3 | 129.5 | 128.7 | 127.9 | 127.1 | 46 | |
| 9-44 | 45 | 136.4 | 135.8 | 135.1 | 134.5 | 133.8 | 133.2 | 132.5 | 131.8 | 131.0 | 130.3 | 129.5 | 128.8 | 127.9 | 127.1 | 126.3 | 45 | 2-16 |
| | 44 | 135.8 | 135.2 | 134.6 | 133.9 | 133.2 | 132.6 | 131.8 | 131.1 | 130.3 | 129.6 | 128.8 | 128.0 | 127.1 | 126.3 | 125.4 | 44 | |
| | 43 | 135.3 | 134.7 | 134.0 | 133.3 | 132.6 | 131.9 | 131.1 | 130.4 | 129.6 | 128.8 | 128.0 | 127.1 | 126.2 | 125.3 | 124.4 | 43 | |
| | 42 | 134.8 | 134.1 | 133.4 | 132.7 | 132.0 | 131.3 | 130.5 | 129.7 | 128.9 | 128.0 | 127.2 | 126.3 | 125.4 | 124.4 | 123.5 | 42 | |
| | 41 | 134.2 | 133.5 | 132.8 | 132.0 | 131.3 | 130.5 | 129.7 | 128.9 | 128.1 | 127.2 | 126.3 | 125.4 | 124.4 | 123.5 | 122.5 | 41 | |
| | 49 | 137.2 | 136.6 | 136.1 | 135.5 | 134.9 | 134.4 | 133.8 | 133.2 | 132.5 | 131.9 | 131.2 | 130.6 | 129.9 | 129.1 | 128.4 | 49 | |
| | 48 | 136.7 | 136.2 | 135.6 | 135.0 | 134.4 | 133.8 | 133.2 | 132.6 | 131.9 | 131.2 | 130.6 | 129.9 | 129.1 | 128.4 | 127.6 | 48 | |
| | 47 | 136.3 | 135.7 | 135.1 | 134.5 | 133.9 | 133.3 | 132.6 | 131.9 | 131.3 | 130.6 | 129.9 | 129.1 | 128.4 | 127.6 | 126.8 | 47 | |
| | 46 | 135.8 | 135.2 | 134.6 | 134.0 | 133.3 | 132.7 | 132.0 | 131.3 | 130.6 | 129.9 | 129.1 | 128.4 | 127.6 | 126.8 | 126.0 | 46 | |
| 9-40 | 45 | 135.3 | 134.7 | 134.0 | 133.4 | 132.7 | 132.1 | 131.4 | 130.7 | 129.9 | 129.2 | 128.4 | 127.6 | 126.8 | 126.0 | 125.1 | 45 | 2-20 |
| | 44 | 134.8 | 134.1 | 133.5 | 132.8 | 132.1 | 131.4 | 130.7 | 130.0 | 129.2 | 128.4 | 127.6 | 126.8 | 126.0 | 125.1 | 124.2 | 44 | |
| | 43 | 134.3 | 133.6 | 132.9 | 132.2 | 131.5 | 130.8 | 130.0 | 129.3 | 128.5 | 127.7 | 126.8 | 126.0 | 125.1 | 124.2 | 123.3 | 43 | |
| | 42 | 133.7 | 133.0 | 132.3 | 131.6 | 130.9 | 130.1 | 129.3 | 128.5 | 127.7 | 126.9 | 126.0 | 125.1 | 124.2 | 123.3 | 122.3 | 42 | |
| | 41 | 133.1 | 132.4 | 131.7 | 131.0 | 130.2 | 129.4 | 128.6 | 127.8 | 126.9 | 126.1 | 125.2 | 124.3 | 123.3 | 122.3 | 121.3 | 41 | |
| | 49 | 136.1 | 135.6 | 135.0 | 134.4 | 133.9 | 133.3 | 132.7 | 132.0 | 131.4 | 130.8 | 130.1 | 129.4 | 128.7 | 128.0 | 127.3 | 49 | |
| | 48 | 135.7 | 135.1 | 134.5 | 133.9 | 133.3 | 132.7 | 132.1 | 131.5 | 130.8 | 130.1 | 129.4 | 128.7 | 128.0 | 127.2 | 126.5 | 48 | |
| | 47 | 135.2 | 134.6 | 134.0 | 133.4 | 132.8 | 132.2 | 131.5 | 130.9 | 130.2 | 129.5 | 128.7 | 128.0 | 127.2 | 126.5 | 125.7 | 47 | |
| | 46 | 134.7 | 134.1 | 133.5 | 132.9 | 132.2 | 131.6 | 130.9 | 130.2 | 129.5 | 128.8 | 128.0 | 127.3 | 126.4 | 125.6 | 124.8 | 46 | |
| 9-36 | 45 | 134.2 | 133.6 | 133.0 | 132.3 | 131.6 | 131.0 | 130.3 | 129.6 | 128.8 | 128.1 | 127.3 | 126.5 | 125.7 | 124.8 | 123.9 | 45 | 2-24 |
| | 44 | 133.7 | 133.1 | 132.4 | 131.7 | 131.1 | 130.4 | 129.6 | 128.9 | 128.1 | 127.3 | 126.5 | 125.7 | 124.8 | 124.0 | 123.1 | 44 | |
| | 43 | 133.2 | 132.5 | 131.9 | 131.2 | 130.4 | 129.7 | 128.9 | 128.2 | 127.5 | 126.6 | 125.7 | 124.9 | 124.0 | 123.1 | 122.2 | 43 | |
| | 42 | 132.7 | 132.0 | 131.2 | 130.5 | 129.8 | 129.0 | 128.2 | 127.5 | 126.6 | 125.8 | 124.9 | 124.0 | 123.1 | 122.2 | 121.2 | 42 | |
| | 41 | 132.1 | 131.4 | 130.6 | 129.9 | 129.1 | 128.3 | 127.5 | 126.7 | 125.9 | 125.0 | 124.1 | 123.2 | 122.2 | 121.2 | 120.2 | 41 | |
| | 49 | 135.1 | 134.5 | 134.0 | 133.4 | 132.8 | 132.2 | 131.6 | 130.9 | 130.3 | 129.7 | 129.0 | 128.3 | 127.6 | 126.9 | 126.1 | 49 | |
| | 48 | 134.6 | 134.0 | 133.5 | 132.9 | 132.3 | 131.6 | 131.0 | 130.4 | 129.7 | 129.0 | 128.3 | 127.6 | 126.9 | 126.1 | 125.4 | 48 | |
| | 47 | 134.1 | 133.6 | 133.0 | 132.3 | 131.7 | 131.1 | 130.4 | 129.8 | 129.1 | 128.4 | 127.6 | 126.9 | 126.1 | 125.3 | 124.5 | 47 | |
| | 46 | 133.7 | 133.1 | 132.4 | 131.8 | 131.2 | 130.5 | 129.8 | 129.1 | 128.4 | 127.7 | 126.9 | 126.1 | 125.3 | 124.5 | 123.7 | 46 | |
| 9-32 | 45 | 133.2 | 132.6 | 131.9 | 131.3 | 130.6 | 129.9 | 129.2 | 128.5 | 127.7 | 127.0 | 126.2 | 125.4 | 124.6 | 123.7 | 122.8 | 45 | 2-28 |
| | 44 | 132.7 | 132.0 | 131.4 | 130.7 | 130.0 | 129.3 | 128.5 | 127.8 | 127.0 | 126.2 | 125.4 | 124.6 | 123.7 | 122.9 | 122.0 | 44 | |
| | 43 | 132.2 | 131.5 | 130.8 | 130.1 | 129.4 | 128.6 | 127.9 | 127.1 | 126.3 | 125.5 | 124.6 | 123.8 | 122.9 | 122.0 | 121.1 | 43 | |
| | 42 | 131.6 | 130.9 | 130.2 | 129.5 | 128.7 | 128.0 | 127.2 | 126.4 | 125.5 | 124.7 | 123.8 | 122.9 | 122.0 | 121.1 | 120.1 | 42 | |
| | 41 | 131.0 | 130.3 | 129.6 | 128.8 | 128.1 | 127.3 | 126.5 | 125.6 | 124.8 | 123.9 | 123.0 | 122.1 | 121.1 | 120.2 | 119.2 | 41 | |
| | 49 | 134.0 | 133.5 | 132.9 | 132.3 | 131.7 | 131.1 | 130.5 | 129.9 | 129.2 | 128.6 | 127.9 | 127.2 | 126.5 | 125.8 | 125.0 | 49 | |
| | 48 | 133.6 | 133.0 | 132.4 | 131.8 | 131.2 | 130.6 | 129.9 | 129.3 | 128.6 | 127.9 | 127.2 | 126.5 | 125.8 | 125.0 | 124.2 | 48 | |
| | 47 | 133.1 | 132.5 | 131.9 | 131.3 | 130.7 | 130.0 | 129.4 | 128.7 | 128.0 | 127.3 | 126.5 | 125.8 | 125.0 | 124.2 | 123.4 | 47 | |
| | 46 | 132.6 | 132.0 | 131.4 | 130.8 | 130.1 | 129.5 | 128.8 | 128.0 | 127.3 | 126.6 | 125.8 | 125.0 | 124.2 | 123.4 | 122.6 | 46 | |
| 9-28 | 45 | 132.1 | 131.5 | 130.9 | 130.2 | 129.5 | 128.8 | 128.1 | 127.4 | 126.6 | 125.9 | 125.1 | 124.3 | 123.5 | 122.6 | 121.7 | 45 | 2-32 |
| | 44 | 131.6 | 131.0 | 130.3 | 129.6 | 128.9 | 128.2 | 127.5 | 126.7 | 125.9 | 125.2 | 124.3 | 123.5 | 122.7 | 121.8 | 120.9 | 44 | |
| | 43 | 131.1 | 130.4 | 129.7 | 129.0 | 128.3 | 127.6 | 126.8 | 126.0 | 125.2 | 124.4 | 123.6 | 122.7 | 121.8 | 120.9 | 120.0 | 43 | |
| | 42 | 130.6 | 129.9 | 129.2 | 128.4 | 127.7 | 126.9 | 126.1 | 125.3 | 124.5 | 123.6 | 122.8 | 121.9 | 121.0 | 120.0 | 119.1 | 42 | |
| | 41 | 130.0 | 129.3 | 128.6 | 127.8 | 127.0 | 126.2 | 125.4 | 124.6 | 123.7 | 122.9 | 122.0 | 121.0 | 120.1 | 119.1 | 118.1 | 41 | |
| | 49 | 133.0 | 132.4 | 131.9 | 131.3 | 130.7 | 130.1 | 129.4 | 128.8 | 128.1 | 127.5 | 126.8 | 126.1 | 125.4 | 124.7 | 123.9 | 49 | |
| | 48 | 132.5 | 132.0 | 131.4 | 130.8 | 130.2 | 129.5 | 128.9 | 128.2 | 127.5 | 126.8 | 126.1 | 125.4 | 124.7 | 123.9 | 123.1 | 48 | |
| | 47 | 132.1 | 131.5 | 130.9 | 130.3 | 129.6 | 129.0 | 128.3 | 127.6 | 126.9 | 126.2 | 125.5 | 124.7 | 123.9 | 123.1 | 122.3 | 47 | |
| | 46 | 131.6 | 131.0 | 130.4 | 129.7 | 129.1 | 128.4 | 127.7 | 127.0 | 126.2 | 125.5 | 124.8 | 124.0 | 123.2 | 122.4 | 121.5 | 46 | |
| 9-24 | 45 | 131.1 | 130.5 | 129.8 | 129.2 | 128.5 | 127.8 | 127.1 | 126.3 | 125.6 | 124.8 | 124.0 | 123.2 | 122.4 | 121.5 | 120.7 | 45 | 2-36 |
| | 44 | 130.6 | 130.0 | 129.3 | 128.6 | 127.8 | 127.2 | 126.4 | 125.7 | 124.9 | 124.1 | 123.3 | 122.4 | 121.6 | 120.7 | 119.8 | 44 | |
| | 43 | 130.1 | 129.4 | 128.7 | 128.0 | 127.3 | 126.5 | 125.8 | 125.0 | 124.2 | 123.4 | 122.5 | 121.6 | 120.8 | 119.9 | 118.9 | 43 | |
| | 42 | 129.6 | 128.9 | 128.1 | 127.4 | 126.6 | 125.9 | 125.1 | 124.3 | 123.4 | 122.6 | 121.7 | 120.8 | 119.9 | 119.0 | 118.0 | 42 | |
| | 41 | 129.0 | 128.3 | 127.5 | 126.8 | 126.0 | 125.2 | 124.4 | 123.6 | 122.7 | 121.8 | 120.9 | 120.0 | 119.1 | 118.1 | 117.1 | 41 | |
| | 49 | 132.0 | 131.4 | 130.8 | 130.2 | 129.6 | 129.0 | 128.4 | 127.8 | 127.1 | 126.4 | 125.7 | 125.0 | 124.3 | 123.6 | 122.8 | 49 | |
| | 48 | 131.5 | 130.9 | 130.4 | 129.7 | 129.1 | 128.5 | 127.8 | 127.2 | 126.5 | 125.8 | 125.1 | 124.4 | 123.6 | 122.8 | 122.1 | 48 | |
| | 47 | 131.1 | 130.5 | 129.9 | 129.2 | 128.6 | 127.9 | 127.2 | 126.6 | 125.9 | 125.1 | 124.4 | 123.6 | 122.9 | 122.1 | 121.3 | 47 | |
| | 46 | 130.6 | 130.0 | 129.3 | 128.7 | 128.0 | 127.3 | 126.6 | 125.9 | 225.2 | 224.5 | 123.7 | 122.9 | 122.1 | 121.3 | 120.5 | 46 | |
| 9-20 | 45 | 130.1 | 129.5 | 128.8 | 128.1 | 127.5 | 126.7 | 126.0 | 125.3 | 224.5 | 123.8 | 123.0 | 122.2 | 121.3 | 120.5 | 119.6 | 45 | 2-40 |
| | 44 | 129.6 | 129.0 | 128.3 | 127.6 | 126.9 | 126.1 | 125.4 | 124.6 | 123.9 | 123.1 | 122.2 | 121.4 | 120.5 | 119.7 | 118.8 | 44 | |
| | 43 | 129.1 | 128.4 | 127.7 | 127.0 | 126.3 | 125.5 | 124.7 | 124.0 | 123.1 | 122.3 | 121.5 | 120.6 | 119.7 | 118.8 | 117.9 | 43 | |
| | 42 | 128.6 | 127.9 | 127.1 | 126.4 | 125.6 | 124.9 | 124.1 | 123.3 | 122.4 | 121.6 | 120.7 | 119.8 | 118.9 | 118.0 | 117.0 | 42 | |
| | 41 | 128.0 | 127.3 | 126.5 | 125.8 | 125.0 | 124.2 | 123.4 | 122.5 | 121.7 | 120.8 | 119.9 | 119.0 | 118.0 | 117.1 | 116.1 | 41 | |
| | 49 | 131.0 | 130.4 | 129.8 | 129.2 | 128.6 | 128.0 | 127.4 | 126.7 | 126.0 | 125.4 | 124.7 | 124.0 | 123.3 | 122.5 | 121.8 | 49 | |
| | 48 | 130.5 | 129.9 | 129.3 | 128.7 | 128.1 | 127.4 | 126.8 | 126.1 | 125.4 | 124.7 | 124.0 | 123.3 | 122.5 | 121.8 | 121.0 | 48 | |
| | 47 | 130.1 | 129.5 | 128.8 | 128.2 | 127.6 | 126.9 | 126.2 | 125.5 | 124.8 | 124.1 | 123.3 | 122.6 | 121.8 | 121.0 | 120.2 | 47 | |
| | 46 | 129.6 | 129.0 | 128.3 | 127.7 | 127.0 | 126.3 | 125.6 | 124.9 | 124.2 | 123.4 | 122.7 | 121.9 | 121.1 | 120.3 | 119.4 | 46 | |
| 9-16 | 45 | 129.1 | 128.5 | 127.8 | 127.1 | 126.4 | 125.7 | 125.0 | 124.3 | 123.5 | 122.7 | 121.9 | 121.1 | 120.3 | 119.4 | 118.6 | 45 | 2-44 |
| | 44 | 128.6 | 128.0 | 127.3 | 126.6 | 125.8 | 125.1 | 124.4 | 123.6 | 122.8 | 122.0 | 121.2 | 120.4 | 119.5 | 118.6 | 117.7 | 44 | |
| | 43 | 128.1 | 127.4 | 126.7 | 126.0 | 125.3 | 124.5 | 123.7 | 122.9 | 122.1 | 121.3 | 120.5 | 119.6 | 118.7 | 117.8 | 116.9 | 43 | |
| | 42 | 127.6 | 126.9 | 126.1 | 125.4 | 124.6 | 123.9 | 123.1 | 122.3 | 121.4 | 120.6 | 119.7 | 118.8 | 117.9 | 116.9 | 116.0 | 42 | |
| | 41 | 127.0 | 126.3 | 125.6 | 124.8 | 124.0 | 123.2 | 122.4 | 121.5 | 120.7 | 119.8 | 118.9 | 118.0 | 117.0 | 116.0 | 115.1 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

9 hrs. 48 m. to 9 hrs. 16 m. 2 hrs. 12 m. to 2 hrs. 44 m.

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 130.0 | 129.2 | 128.4 | 127.6 | 126.8 | 125.9 | 125.0 | 124.0 | 123.1 | 122.0 | 121.0 | 119.9 | 118.7 | 117.6 | 116.3 | 49 | |
| | 48 | 129.2 | 128.4 | 127.6 | 126.7 | 125.8 | 124.9 | 123.9 | 122.9 | 121.9 | 120.9 | 119.7 | 118.6 | 117.4 | 116.2 | 114.9 | 48 | |
| | 47 | 128.3 | 127.5 | 126.6 | 125.7 | 124.8 | 123.8 | 122.8 | 121.8 | 120.8 | 119.6 | 118.5 | 117.3 | 116.0 | 114.7 | 113.4 | 47 | |
| | 46 | 127.5 | 126.6 | 125.7 | 124.7 | 123.8 | 122.7 | 121.7 | 120.6 | 119.5 | 118.4 | 117.2 | 115.9 | 114.6 | 113.2 | 111.8 | 46 | |
| 9-48 | 45 | 126.5 | 125.6 | 124.7 | 123.7 | 122.7 | 121.6 | 120.6 | 119.4 | 118.3 | 117.1 | 115.8 | 114.5 | 113.1 | 111.7 | 110.3 | 45 | 2-12 |
| | 44 | 125.6 | 124.7 | 123.7 | 122.6 | 121.6 | 120.5 | 119.4 | 118.2 | 117.0 | 115.7 | 114.4 | 113.1 | 111.6 | 110.2 | 108.7 | 44 | |
| | 43 | 124.6 | 123.6 | 122.6 | 121.6 | 120.5 | 119.3 | 118.1 | 116.9 | 115.7 | 114.3 | 113.0 | 111.6 | 110.1 | 108.6 | 107.0 | 43 | |
| | 42 | 123.6 | 122.6 | 121.5 | 120.4 | 119.3 | 118.1 | 116.9 | 115.6 | 114.3 | 112.9 | 111.5 | 110.0 | 108.5 | 107.0 | 105.3 | 42 | |
| | 41 | 122.6 | 121.5 | 120.4 | 119.3 | 118.1 | 116.8 | 115.6 | 114.3 | 112.9 | 111.5 | 110.0 | 108.5 | 106.9 | 105.3 | 103.6 | 41 | |
| | 49 | 128.8 | 128.0 | 127.2 | 126.4 | 125.6 | 124.7 | 123.8 | 122.8 | 121.8 | 120.8 | 119.8 | 118.7 | 117.5 | 116.3 | 115.1 | 49 | |
| | 48 | 128.0 | 127.2 | 126.4 | 125.5 | 124.6 | 123.7 | 122.7 | 121.7 | 120.7 | 119.6 | 118.5 | 117.4 | 116.2 | 115.0 | 113.7 | 48 | |
| | 47 | 127.2 | 126.3 | 125.4 | 124.5 | 123.6 | 122.6 | 121.6 | 120.6 | 119.6 | 118.4 | 117.3 | 116.1 | 114.8 | 113.5 | 112.2 | 47 | |
| | 46 | 126.3 | 125.4 | 124.5 | 123.5 | 122.6 | 121.6 | 120.5 | 119.4 | 118.3 | 117.2 | 116.0 | 114.7 | 113.4 | 112.1 | 110.7 | 46 | |
| 9-44 | 45 | 125.4 | 124.4 | 123.5 | 122.5 | 121.5 | 120.5 | 119.4 | 118.3 | 117.1 | 115.9 | 114.6 | 113.3 | 112.0 | 110.6 | 109.2 | 45 | 2-16 |
| | 44 | 124.4 | 123.5 | 122.5 | 121.5 | 120.4 | 119.3 | 118.2 | 117.0 | 115.8 | 114.6 | 113.3 | 111.9 | 110.5 | 109.1 | 107.6 | 44 | |
| | 43 | 123.5 | 122.5 | 121.4 | 120.4 | 119.3 | 118.2 | 117.0 | 115.8 | 114.5 | 113.2 | 111.9 | 110.5 | 109.0 | 107.5 | 106.0 | 43 | |
| | 42 | 122.5 | 121.4 | 120.4 | 119.3 | 118.1 | 117.0 | 115.7 | 114.5 | 113.2 | 111.8 | 110.4 | 109.0 | 107.5 | 105.9 | 104.3 | 42 | |
| | 41 | 121.4 | 120.4 | 119.3 | 118.1 | 116.9 | 115.7 | 114.5 | 113.2 | 111.8 | 110.4 | 108.9 | 107.5 | 105.9 | 104.3 | 102.7 | 41 | |
| | 49 | 127.7 | 126.9 | 126.1 | 125.2 | 124.4 | 123.5 | 122.6 | 121.6 | 120.6 | 119.6 | 118.6 | 117.5 | 116.4 | 115.2 | 114.0 | 49 | |
| | 48 | 126.8 | 126.0 | 125.2 | 124.3 | 123.4 | 122.5 | 121.5 | 120.5 | 119.5 | 118.5 | 117.4 | 116.2 | 115.0 | 113.8 | 112.5 | 48 | |
| | 47 | 126.0 | 125.1 | 124.3 | 123.4 | 122.4 | 121.5 | 120.5 | 119.4 | 118.4 | 117.3 | 116.1 | 114.9 | 113.7 | 112.4 | 111.1 | 47 | |
| | 46 | 125.1 | 124.2 | 123.3 | 122.4 | 121.4 | 120.4 | 119.4 | 118.3 | 117.2 | 116.0 | 114.8 | 113.6 | 112.3 | 111.0 | 109.6 | 46 | |
| 9-40 | 45 | 124.2 | 123.3 | 122.3 | 121.4 | 120.4 | 119.3 | 118.2 | 117.1 | 116.0 | 114.8 | 113.5 | 112.2 | 110.9 | 109.5 | 108.1 | 45 | 2-20 |
| | 44 | 123.3 | 122.3 | 121.3 | 120.3 | 119.3 | 118.2 | 117.1 | 115.9 | 114.7 | 113.5 | 112.2 | 110.8 | 109.5 | 108.0 | 106.5 | 44 | |
| | 43 | 122.3 | 121.3 | 120.3 | 119.2 | 118.2 | 117.0 | 115.9 | 114.7 | 113.4 | 112.1 | 110.8 | 109.4 | 108.0 | 106.5 | 105.0 | 43 | |
| | 42 | 121.3 | 120.3 | 119.2 | 118.1 | 117.0 | 115.8 | 114.6 | 113.4 | 112.1 | 110.7 | 109.4 | 107.9 | 106.5 | 104.9 | 103.4 | 42 | |
| | 41 | 120.3 | 119.2 | 118.1 | 117.0 | 115.8 | 114.6 | 113.4 | 112.1 | 110.7 | 109.4 | 107.9 | 106.5 | 104.9 | 103.4 | 101.7 | 41 | |
| | 49 | 126.5 | 125.7 | 124.9 | 124.1 | 123.2 | 122.3 | 121.4 | 120.5 | 119.5 | 118.5 | 117.4 | 116.3 | 115.2 | 114.0 | 112.8 | 49 | |
| | 48 | 125.7 | 124.9 | 124.0 | 123.2 | 122.3 | 121.3 | 120.4 | 119.4 | 118.4 | 117.3 | 116.2 | 115.1 | 113.9 | 112.7 | 111.4 | 48 | |
| | 47 | 124.8 | 124.0 | 123.1 | 122.2 | 121.3 | 120.3 | 119.3 | 118.3 | 117.2 | 116.1 | 115.0 | 113.8 | 112.6 | 111.3 | 110.0 | 47 | |
| | 46 | 124.0 | 123.1 | 122.2 | 121.2 | 120.3 | 119.2 | 118.2 | 117.1 | 116.0 | 114.9 | 113.7 | 112.5 | 111.2 | 109.9 | 108.5 | 46 | |
| 9-36 | 45 | 123.1 | 122.1 | 121.2 | 120.2 | 119.2 | 118.2 | 117.1 | 116.0 | 114.8 | 113.6 | 112.4 | 111.1 | 109.8 | 108.4 | 107.0 | 45 | 2-24 |
| | 44 | 122.1 | 121.2 | 120.2 | 119.2 | 118.1 | 117.1 | 115.9 | 114.8 | 113.6 | 112.4 | 111.1 | 109.8 | 108.4 | 107.0 | 105.5 | 44 | |
| | 43 | 121.2 | 120.2 | 119.2 | 118.1 | 117.0 | 115.9 | 114.8 | 113.6 | 112.3 | 111.0 | 109.7 | 108.4 | 106.9 | 105.5 | 104.0 | 43 | |
| | 42 | 120.2 | 119.2 | 118.1 | 117.0 | 115.9 | 114.8 | 113.5 | 112.3 | 111.0 | 109.7 | 108.3 | 106.9 | 105.5 | 104.0 | 102.4 | 42 | |
| | 41 | 119.2 | 118.1 | 117.1 | 115.9 | 114.8 | 113.6 | 112.3 | 111.0 | 109.7 | 108.3 | 106.9 | 105.5 | 104.0 | 102.4 | 100.8 | 41 | |
| | 49 | 125.4 | 124.6 | 123.8 | 122.9 | 122.1 | 121.2 | 120.3 | 119.3 | 118.3 | 117.3 | 116.3 | 115.2 | 114.0 | 112.9 | 111.7 | 49 | |
| | 48 | 124.6 | 123.7 | 122.9 | 122.0 | 121.1 | 120.2 | 119.2 | 118.2 | 117.2 | 116.2 | 115.1 | 113.9 | 112.8 | 111.6 | 110.3 | 48 | |
| | 47 | 123.7 | 122.8 | 122.0 | 121.1 | 120.1 | 119.2 | 118.2 | 117.1 | 116.1 | 115.0 | 113.9 | 112.7 | 111.5 | 110.2 | 108.9 | 47 | |
| | 46 | 122.8 | 121.9 | 121.0 | 120.1 | 119.1 | 118.1 | 117.1 | 116.0 | 114.9 | 113.8 | 112.6 | 111.4 | 110.1 | 108.8 | 107.5 | 46 | |
| 9-32 | 45 | 121.9 | 121.0 | 120.1 | 119.1 | 118.1 | 117.1 | 116.0 | 114.9 | 113.7 | 112.5 | 111.3 | 110.1 | 108.8 | 107.4 | 106.0 | 45 | 2-28 |
| | 44 | 121.0 | 120.1 | 119.1 | 118.1 | 117.0 | 116.0 | 114.9 | 113.7 | 112.5 | 111.3 | 110.0 | 108.7 | 107.4 | 106.0 | 104.6 | 44 | |
| | 43 | 120.1 | 119.1 | 118.1 | 117.0 | 116.0 | 114.8 | 113.7 | 112.5 | 111.3 | 110.0 | 108.7 | 107.3 | 106.0 | 104.5 | 103.0 | 43 | |
| | 42 | 119.1 | 118.1 | 117.0 | 116.0 | 114.8 | 113.7 | 112.5 | 111.3 | 110.0 | 108.7 | 107.3 | 105.9 | 104.5 | 103.0 | 101.5 | 42 | |
| | 41 | 118.1 | 117.1 | 116.0 | 114.8 | 113.7 | 112.5 | 111.3 | 110.0 | 108.7 | 107.3 | 106.0 | 104.5 | 103.0 | 101.5 | 100.0 | 41 | |
| | 49 | 124.2 | 123.2 | 122.6 | 121.8 | 120.9 | 120.0 | 119.1 | 118.2 | 117.2 | 116.2 | 115.1 | 114.0 | 112.9 | 111.8 | 110.6 | 49 | |
| | 48 | 123.4 | 122.6 | 121.8 | 120.9 | 120.0 | 119.1 | 118.1 | 117.1 | 116.1 | 115.0 | 114.0 | 112.8 | 111.7 | 110.5 | 109.2 | 48 | |
| | 47 | 122.6 | 121.7 | 120.9 | 119.9 | 119.0 | 118.0 | 117.1 | 116.0 | 115.0 | 113.9 | 112.8 | 111.6 | 110.4 | 109.1 | 107.9 | 47 | |
| | 46 | 121.7 | 120.8 | 119.9 | 119.0 | 118.0 | 117.0 | 116.0 | 114.9 | 113.8 | 112.7 | 111.5 | 110.3 | 109.1 | 107.8 | 106.5 | 46 | |
| 9-28 | 45 | 120.9 | 119.9 | 119.0 | 118.0 | 117.0 | 116.0 | 114.9 | 113.8 | 112.7 | 111.5 | 110.3 | 109.0 | 107.7 | 106.4 | 105.0 | 45 | 2-32 |
| | 44 | 120.0 | 119.0 | 118.0 | 117.0 | 116.0 | 114.9 | 113.8 | 112.6 | 111.5 | 110.3 | 109.0 | 107.7 | 106.4 | 105.0 | 103.6 | 44 | |
| | 43 | 119.0 | 118.0 | 117.0 | 116.0 | 114.9 | 113.8 | 112.6 | 111.5 | 110.2 | 109.0 | 107.7 | 106.4 | 105.0 | 103.6 | 102.1 | 43 | |
| | 42 | 118.1 | 117.0 | 116.0 | 114.9 | 113.8 | 112.6 | 111.5 | 110.3 | 109.0 | 107.7 | 106.4 | 105.0 | 103.6 | 102.1 | 100.6 | 42 | |
| | 41 | 117.1 | 116.0 | 114.9 | 113.8 | 112.7 | 111.5 | 110.3 | 109.0 | 107.7 | 106.4 | 105.0 | 103.6 | 102.1 | 100.6 | 99.1 | 41 | |
| | 49 | 123.1 | 122.3 | 121.5 | 120.7 | 119.8 | 118.9 | 118.0 | 117.1 | 116.1 | 115.1 | 114.0 | 113.0 | 111.8 | 110.7 | 109.5 | 49 | |
| | 48 | 122.3 | 121.5 | 120.7 | 119.8 | 118.9 | 118.0 | 117.0 | 116.0 | 115.0 | 114.0 | 112.9 | 111.8 | 110.6 | 109.4 | 108.2 | 48 | |
| | 47 | 121.5 | 120.6 | 119.8 | 118.8 | 117.9 | 117.0 | 116.0 | 115.0 | 113.9 | 112.8 | 111.7 | 110.5 | 109.3 | 108.1 | 106.8 | 47 | |
| | 46 | 120.7 | 119.8 | 118.9 | 117.9 | 117.0 | 115.9 | 114.9 | 113.9 | 112.8 | 111.6 | 110.5 | 109.3 | 108.1 | 106.8 | 105.5 | 46 | |
| 9-24 | 45 | 119.8 | 118.9 | 117.9 | 116.9 | 115.9 | 114.9 | 113.9 | 112.8 | 111.6 | 110.5 | 109.3 | 108.0 | 106.7 | 105.4 | 104.1 | 45 | 2-36 |
| | 44 | 118.9 | 117.9 | 117.0 | 115.9 | 114.9 | 113.8 | 112.7 | 111.6 | 110.4 | 109.2 | 108.0 | 106.7 | 105.4 | 104.0 | 102.6 | 44 | |
| | 43 | 118.0 | 117.0 | 116.0 | 114.9 | 113.9 | 112.8 | 111.6 | 110.4 | 109.2 | 108.0 | 106.7 | 105.4 | 104.0 | 102.6 | 101.2 | 43 | |
| | 42 | 117.0 | 116.0 | 115.0 | 113.9 | 112.8 | 111.6 | 110.5 | 109.3 | 108.0 | 106.7 | 105.4 | 104.1 | 102.7 | 101.2 | 99.7 | 42 | |
| | 41 | 116.1 | 115.0 | 113.9 | 112.8 | 111.7 | 110.5 | 109.3 | 108.0 | 106.8 | 105.4 | 104.1 | 102.7 | 101.3 | 99.8 | 98.3 | 41 | |
| | 49 | 122.1 | 121.3 | 120.4 | 119.6 | 118.7 | 117.8 | 116.9 | 116.0 | 115.0 | 114.0 | 113.0 | 111.9 | 110.8 | 109.6 | 108.5 | 49 | |
| | 48 | 121.3 | 120.4 | 119.6 | 118.7 | 117.8 | 116.9 | 115.9 | 115.0 | 113.9 | 112.9 | 111.8 | 110.7 | 109.6 | 108.4 | 107.2 | 48 | |
| | 47 | 120.4 | 119.6 | 118.7 | 117.8 | 116.9 | 115.9 | 114.9 | 113.9 | 112.9 | 111.8 | 110.6 | 109.5 | 108.3 | 107.1 | 105.8 | 47 | |
| | 46 | 119.6 | 118.6 | 117.8 | 116.9 | 115.9 | 114.9 | 113.9 | 112.8 | 111.7 | 110.6 | 109.5 | 108.3 | 107.0 | 105.8 | 104.5 | 46 | |
| 9-20 | 45 | 118.7 | 117.8 | 116.9 | 115.9 | 114.9 | 113.9 | 112.8 | 111.7 | 110.6 | 109.5 | 108.3 | 107.0 | 105.8 | 104.5 | 103.1 | 45 | 2-40 |
| | 44 | 117.8 | 116.9 | 115.9 | 114.9 | 113.9 | 112.8 | 111.7 | 110.6 | 109.4 | 108.3 | 107.0 | 105.8 | 104.5 | 103.1 | 101.7 | 44 | |
| | 43 | 116.9 | 116.0 | 114.9 | 113.9 | 112.8 | 111.7 | 110.6 | 109.5 | 108.3 | 107.0 | 105.8 | 104.5 | 103.1 | 101.7 | 100.3 | 43 | |
| | 42 | 116.0 | 115.0 | 113.9 | 112.9 | 111.8 | 110.6 | 109.5 | 108.3 | 107.1 | 105.8 | 104.5 | 103.2 | 101.8 | 100.4 | 98.9 | 42 | |
| | 41 | 115.1 | 114.0 | 112.9 | 111.8 | 110.7 | 109.5 | 108.3 | 107.1 | 105.8 | 104.5 | 103.2 | 101.8 | 100.4 | 99.0 | 97.5 | 41 | |
| | 49 | 121.0 | 120.2 | 119.4 | 118.5 | 117.7 | 116.8 | 115.8 | 114.9 | 113.9 | 112.9 | 111.9 | 110.8 | 109.7 | 108.6 | 107.4 | 49 | |
| | 48 | 120.2 | 119.4 | 118.5 | 117.6 | 116.8 | 115.8 | 114.9 | 113.9 | 112.9 | 111.8 | 110.8 | 109.7 | 108.5 | 107.4 | 106.1 | 48 | |
| | 47 | 119.4 | 118.5 | 117.6 | 116.7 | 115.8 | 114.8 | 113.9 | 112.8 | 111.8 | 110.7 | 109.6 | 108.5 | 107.3 | 106.1 | 104.8 | 47 | |
| | 46 | 118.5 | 117.6 | 116.7 | 115.8 | 114.8 | 113.9 | 112.8 | 111.8 | 110.7 | 109.6 | 108.5 | 107.3 | 106.1 | 104.8 | 103.5 | 46 | |
| 9-16 | 45 | 117.7 | 116.8 | 115.8 | 114.8 | 113.9 | 112.8 | 111.8 | 110.7 | 109.6 | 108.4 | 107.3 | 106.1 | 104.8 | 103.5 | 102.2 | 45 | 2-44 |
| | 44 | 116.8 | 115.9 | 114.9 | 113.9 | 112.9 | 111.8 | 110.7 | 109.6 | 108.5 | 107.3 | 106.1 | 104.8 | 103.5 | 102.2 | 100.8 | 44 | |
| | 43 | 115.9 | 114.9 | 113.9 | 112.9 | 111.8 | 110.8 | 109.6 | 108.5 | 107.3 | 106.1 | 104.8 | 103.5 | 102.2 | 100.9 | 99.5 | 43 | |
| | 42 | 115.0 | 114.0 | 113.0 | 111.9 | 110.8 | 109.7 | 108.5 | 107.3 | 106.1 | 104.9 | 103.6 | 102.3 | 100.9 | 99.5 | 98.1 | 42 | |
| | 41 | 114.1 | 113.0 | 112.0 | 110.9 | 109.7 | 108.6 | 107.4 | 106.2 | 104.9 | 103.6 | 102.3 | 101.0 | 99.6 | 98.1 | 96.7 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 131.0 | 130.4 | 129.8 | 129.2 | 128.6 | 128.0 | 127.4 | 126.7 | 126.0 | 125.4 | 124.7 | 124.0 | 123.3 | 122.5 | 121.8 | 49 | |
| | 48 | 130.5 | 129.9 | 129.3 | 128.7 | 128.1 | 127.4 | 126.8 | 126.1 | 125.4 | 124.7 | 124.0 | 123.3 | 122.5 | 121.8 | 121.0 | 48 | |
| | 47 | 130.1 | 129.5 | 128.8 | 128.2 | 127.6 | 126.9 | 126.2 | 125.5 | 124.8 | 124.1 | 123.3 | 122.6 | 121.8 | 121.0 | 120.2 | 47 | |
| | 46 | 129.6 | 129.0 | 128.3 | 127.7 | 127.0 | 126.3 | 125.6 | 124.9 | 124.2 | 123.4 | 122.7 | 121.9 | 121.1 | 120.3 | 119.4 | 46 | |
| 9-16 | 45 | 129.1 | 128.5 | 127.8 | 127.1 | 126.4 | 125.7 | 125.0 | 124.3 | 123.5 | 122.7 | 121.9 | 121.1 | 120.3 | 119.4 | 118.6 | 45 | 2-44 |
| | 44 | 128.6 | 128.0 | 127.3 | 126.6 | 125.8 | 125.1 | 124.4 | 123.6 | 122.8 | 122.0 | 121.2 | 120.4 | 119.5 | 118.6 | 117.7 | 44 | |
| | 43 | 128.1 | 127.4 | 126.7 | 126.0 | 125.3 | 124.5 | 123.7 | 122.9 | 122.1 | 121.3 | 120.5 | 119.6 | 118.7 | 117.8 | 116.9 | 43 | |
| | 42 | 127.6 | 126.9 | 126.1 | 125.4 | 124.6 | 123.9 | 123.1 | 122.3 | 121.4 | 120.6 | 119.7 | 118.8 | 117.9 | 116.9 | 116.0 | 42 | |
| | 41 | 127.0 | 126.3 | 125.6 | 124.8 | 124.0 | 123.2 | 122.4 | 121.5 | 120.7 | 119.8 | 118.9 | 118.0 | 117.0 | 116.0 | 115.1 | 41 | |
| | 49 | 130.0 | 129.4 | 128.8 | 128.2 | 127.6 | 127.0 | 126.3 | 125.7 | 125.0 | 124.3 | 123.6 | 122.9 | 122.2 | 121.5 | 120.7 | 49 | |
| | 48 | 129.5 | 128.9 | 128.3 | 127.7 | 127.1 | 126.4 | 125.8 | 125.1 | 124.4 | 123.7 | 123.0 | 122.3 | 121.5 | 120.7 | 119.9 | 48 | |
| | 47 | 129.1 | 128.5 | 127.8 | 127.2 | 126.5 | 125.9 | 125.2 | 124.5 | 123.8 | 123.1 | 122.3 | 121.6 | 120.8 | 120.0 | 119.2 | 47 | |
| | 46 | 128.6 | 128.0 | 127.3 | 126.7 | 126.0 | 125.3 | 124.6 | 123.9 | 123.1 | 122.4 | 121.6 | 120.9 | 120.0 | 119.2 | 118.4 | 46 | |
| 9-12 | 45 | 128.2 | 127.5 | 126.8 | 126.1 | 125.4 | 124.7 | 124.0 | 123.3 | 122.5 | 121.7 | 120.9 | 120.1 | 119.3 | 118.4 | 117.5 | 45 | 2-48 |
| | 44 | 127.7 | 127.0 | 126.3 | 125.6 | 124.9 | 124.1 | 123.4 | 122.6 | 121.8 | 121.0 | 120.2 | 119.4 | 118.5 | 117.6 | 116.7 | 44 | |
| | 43 | 127.1 | 126.4 | 125.7 | 125.0 | 124.3 | 123.5 | 122.7 | 121.9 | 121.1 | 120.3 | 119.5 | 118.6 | 117.7 | 116.8 | 115.9 | 43 | |
| | 42 | 126.6 | 125.9 | 125.2 | 124.4 | 123.6 | 122.9 | 122.1 | 121.3 | 120.4 | 119.6 | 118.7 | 117.8 | 116.9 | 116.0 | 115.0 | 42 | |
| | 41 | 126.1 | 125.3 | 124.6 | 123.8 | 123.0 | 122.2 | 121.4 | 120.6 | 119.7 | 118.8 | 117.9 | 117.0 | 116.1 | 115.1 | 114.1 | 41 | |
| | 49 | 129.0 | 128.4 | 127.8 | 127.2 | 126.6 | 126.0 | 125.3 | 124.7 | 124.0 | 123.3 | 122.6 | 121.9 | 121.2 | 120.4 | 119.7 | 49 | |
| | 48 | 128.6 | 128.0 | 127.3 | 126.7 | 126.1 | 125.4 | 124.8 | 124.1 | 123.4 | 122.7 | 122.0 | 121.3 | 120.5 | 119.7 | 118.9 | 48 | |
| | 47 | 128.1 | 127.5 | 126.9 | 126.2 | 125.5 | 124.9 | 124.2 | 123.5 | 122.8 | 122.1 | 121.3 | 120.5 | 119.8 | 119.0 | 118.1 | 47 | |
| | 46 | 127.7 | 127.0 | 126.4 | 125.7 | 125.0 | 124.3 | 123.6 | 122.9 | 122.1 | 121.4 | 120.6 | 119.8 | 119.0 | 118.2 | 117.4 | 46 | |
| 9-08 | 45 | 127.2 | 126.5 | 125.8 | 125.1 | 124.4 | 123.7 | 123.0 | 122.3 | 121.5 | 120.7 | 119.9 | 119.1 | 118.3 | 117.4 | 116.5 | 45 | 2-52 |
| | 44 | 126.7 | 126.0 | 125.3 | 124.6 | 123.9 | 123.1 | 122.4 | 121.6 | 120.8 | 120.0 | 119.2 | 118.4 | 117.5 | 116.7 | 115.7 | 44 | |
| | 43 | 126.2 | 125.5 | 124.8 | 124.0 | 123.3 | 122.5 | 121.8 | 121.0 | 120.1 | 119.3 | 118.5 | 117.6 | 116.7 | 115.8 | 114.9 | 43 | |
| | 42 | 125.7 | 124.9 | 124.2 | 123.4 | 122.7 | 121.9 | 121.1 | 120.3 | 119.5 | 118.6 | 117.7 | 116.8 | 115.9 | 115.0 | 114.0 | 42 | |
| | 41 | 125.1 | 124.4 | 123.6 | 122.8 | 122.0 | 121.2 | 120.4 | 119.6 | 118.7 | 117.9 | 117.0 | 116.0 | 115.1 | 114.1 | 113.2 | 41 | |
| | 49 | 128.0 | 127.4 | 126.8 | 126.2 | 125.6 | 125.0 | 124.3 | 123.7 | 123.0 | 122.3 | 121.6 | 120.9 | 120.2 | 119.4 | 118.7 | 49 | |
| | 48 | 127.6 | 127.0 | 126.4 | 125.7 | 125.1 | 124.4 | 123.8 | 123.1 | 122.4 | 121.7 | 121.0 | 120.2 | 119.5 | 118.7 | 117.9 | 48 | |
| | 47 | 127.1 | 126.5 | 125.9 | 125.2 | 124.6 | 123.9 | 123.2 | 122.5 | 121.8 | 121.1 | 120.3 | 119.5 | 118.8 | 118.0 | 117.1 | 47 | |
| | 46 | 126.7 | 126.0 | 125.4 | 124.7 | 124.0 | 123.3 | 122.6 | 121.9 | 121.1 | 120.4 | 119.6 | 118.8 | 118.0 | 117.2 | 116.4 | 46 | |
| 9-04 | 45 | 126.2 | 125.6 | 124.9 | 124.2 | 123.5 | 122.8 | 122.0 | 121.3 | 120.5 | 119.7 | 118.9 | 118.1 | 117.3 | 116.4 | 115.6 | 45 | 2-56 |
| | 44 | 125.7 | 125.1 | 124.4 | 123.6 | 122.9 | 122.2 | 121.4 | 120.6 | 119.9 | 119.1 | 118.2 | 117.4 | 116.5 | 115.7 | 114.8 | 44 | |
| | 43 | 125.2 | 124.5 | 123.8 | 123.1 | 122.3 | 121.6 | 120.8 | 120.0 | 119.2 | 118.4 | 117.5 | 116.6 | 115.8 | 114.9 | 113.9 | 43 | |
| | 42 | 124.7 | 124.0 | 123.2 | 122.5 | 121.7 | 120.9 | 120.1 | 119.3 | 118.5 | 117.7 | 116.8 | 115.9 | 115.0 | 114.0 | 113.1 | 42 | |
| | 41 | 124.2 | 123.5 | 122.7 | 121.9 | 121.1 | 120.3 | 119.5 | 118.6 | 117.8 | 116.9 | 116.0 | 115.1 | 114.1 | 113.2 | 112.2 | 41 | |
| | 49 | 127.1 | 126.5 | 125.9 | 125.2 | 124.6 | 124.0 | 123.3 | 122.7 | 122.0 | 121.3 | 120.6 | 119.9 | 119.2 | 118.4 | 117.6 | 49 | |
| | 48 | 126.6 | 126.0 | 125.4 | 124.8 | 124.1 | 123.4 | 122.8 | 122.1 | 121.4 | 120.7 | 120.0 | 119.2 | 118.5 | 117.7 | 116.9 | 48 | |
| | 47 | 126.2 | 125.6 | 124.9 | 124.3 | 123.6 | 122.9 | 122.2 | 121.5 | 120.8 | 120.1 | 119.3 | 118.5 | 117.8 | 117.0 | 116.2 | 47 | |
| | 46 | 125.7 | 125.1 | 124.4 | 123.7 | 123.1 | 122.4 | 121.6 | 120.9 | 120.2 | 119.4 | 118.6 | 117.9 | 117.1 | 116.2 | 115.4 | 46 | |
| 9-00 | 45 | 125.3 | 124.6 | 123.9 | 123.2 | 122.5 | 121.8 | 121.1 | 120.3 | 119.5 | 118.8 | 118.0 | 117.2 | 116.3 | 115.5 | 114.6 | 45 | 3-00 |
| | 44 | 124.8 | 124.1 | 123.4 | 122.7 | 122.0 | 121.2 | 120.5 | 119.7 | 118.9 | 118.1 | 117.3 | 116.4 | 115.6 | 114.7 | 113.8 | 44 | |
| | 43 | 124.3 | 123.6 | 122.9 | 122.1 | 121.4 | 120.6 | 119.8 | 119.0 | 118.2 | 117.4 | 116.6 | 115.7 | 114.8 | 113.9 | 113.0 | 43 | |
| | 42 | 123.8 | 123.1 | 122.3 | 121.6 | 120.8 | 120.0 | 119.2 | 118.4 | 117.5 | 116.7 | 115.8 | 114.9 | 114.0 | 113.1 | 112.2 | 42 | |
| | 41 | 123.3 | 122.5 | 121.8 | 121.0 | 120.2 | 119.4 | 118.5 | 117.7 | 116.9 | 116.0 | 115.1 | 114.2 | 113.2 | 112.3 | 111.3 | 41 | |
| | 49 | 126.1 | 125.5 | 124.9 | 124.3 | 123.6 | 123.0 | 122.3 | 121.7 | 121.0 | 120.3 | 119.6 | 118.9 | 118.2 | 117.4 | 116.6 | 49 | |
| | 48 | 125.7 | 125.1 | 124.4 | 123.8 | 123.1 | 122.5 | 121.8 | 121.1 | 120.4 | 119.7 | 119.0 | 118.2 | 117.5 | 116.7 | 115.9 | 48 | |
| | 47 | 125.2 | 124.6 | 124.0 | 123.3 | 122.6 | 121.9 | 121.2 | 120.5 | 119.8 | 119.1 | 118.3 | 117.6 | 116.8 | 116.0 | 115.2 | 47 | |
| | 46 | 124.8 | 124.1 | 123.5 | 122.8 | 122.1 | 121.4 | 120.7 | 119.9 | 119.2 | 118.5 | 117.7 | 116.9 | 116.1 | 115.3 | 114.4 | 46 | |
| 8-56 | 45 | 124.3 | 123.7 | 123.0 | 122.3 | 121.6 | 120.8 | 120.1 | 119.4 | 118.6 | 117.8 | 117.0 | 116.2 | 115.4 | 114.5 | 113.7 | 45 | 3-04 |
| | 44 | 123.9 | 123.2 | 122.5 | 121.7 | 121.0 | 120.3 | 119.5 | 118.7 | 117.9 | 117.1 | 116.3 | 115.5 | 114.6 | 113.8 | 112.9 | 44 | |
| | 43 | 123.4 | 122.7 | 121.9 | 121.2 | 120.4 | 119.7 | 118.9 | 118.1 | 117.3 | 116.5 | 115.6 | 114.8 | 113.9 | 113.0 | 112.1 | 43 | |
| | 42 | 122.9 | 122.1 | 121.4 | 120.6 | 119.9 | 119.1 | 118.3 | 117.5 | 116.6 | 115.8 | 114.9 | 114.0 | 113.1 | 112.2 | 111.2 | 42 | |
| | 41 | 122.4 | 121.6 | 120.8 | 120.1 | 119.3 | 118.5 | 117.6 | 116.8 | 115.9 | 115.1 | 114.2 | 113.3 | 112.3 | 111.4 | 110.4 | 41 | |
| | 49 | 125.1 | 124.5 | 123.9 | 123.3 | 122.7 | 122.0 | 121.4 | 120.7 | 120.0 | 119.3 | 118.6 | 117.9 | 117.2 | 116.4 | 115.7 | 49 | |
| | 48 | 124.7 | 124.1 | 123.5 | 122.8 | 122.2 | 121.5 | 120.8 | 120.1 | 119.4 | 118.7 | 118.0 | 117.3 | 116.5 | 115.7 | 114.9 | 48 | |
| | 47 | 124.3 | 123.7 | 123.0 | 122.3 | 121.7 | 121.0 | 120.3 | 119.6 | 118.9 | 118.1 | 117.4 | 116.6 | 115.8 | 115.0 | 114.2 | 47 | |
| | 46 | 123.9 | 123.2 | 122.5 | 121.9 | 121.2 | 120.4 | 119.7 | 119.0 | 118.2 | 117.5 | 116.7 | 115.9 | 115.1 | 114.3 | 113.5 | 46 | |
| 8-52 | 45 | 123.4 | 122.8 | 122.1 | 121.3 | 120.6 | 119.9 | 119.2 | 118.4 | 117.6 | 116.9 | 116.0 | 115.2 | 114.4 | 113.6 | 112.7 | 45 | 3-08 |
| | 44 | 122.9 | 122.2 | 121.5 | 120.8 | 120.1 | 119.3 | 118.6 | 117.8 | 117.0 | 116.2 | 115.4 | 114.5 | 113.7 | 112.8 | 111.9 | 44 | |
| | 43 | 122.5 | 121.7 | 121.0 | 120.3 | 119.5 | 118.8 | 118.0 | 117.2 | 116.4 | 115.5 | 114.7 | 113.8 | 113.0 | 112.1 | 111.1 | 43 | |
| | 42 | 122.0 | 121.2 | 120.5 | 119.7 | 118.9 | 118.2 | 117.4 | 116.5 | 115.7 | 114.9 | 114.0 | 113.1 | 112.2 | 111.3 | 110.3 | 42 | |
| | 41 | 121.5 | 120.7 | 119.9 | 119.2 | 118.4 | 117.6 | 116.7 | 115.9 | 115.0 | 114.2 | 113.3 | 112.4 | 111.4 | 110.5 | 109.5 | 41 | |
| | 49 | 124.2 | 123.6 | 123.0 | 122.4 | 121.7 | 121.1 | 120.4 | 119.7 | 119.1 | 118.4 | 117.7 | 116.9 | 116.2 | 115.5 | 114.7 | 49 | |
| | 48 | 123.8 | 123.2 | 122.5 | 121.9 | 121.2 | 120.6 | 119.9 | 119.2 | 118.5 | 117.8 | 117.0 | 116.3 | 115.5 | 114.8 | 114.0 | 48 | |
| | 47 | 123.4 | 122.7 | 122.1 | 121.4 | 120.7 | 120.0 | 119.3 | 118.6 | 117.9 | 117.2 | 116.4 | 115.7 | 114.9 | 114.1 | 113.3 | 47 | |
| | 46 | 122.9 | 122.3 | 121.6 | 120.9 | 120.2 | 119.5 | 118.8 | 118.0 | 117.3 | 116.6 | 115.8 | 115.0 | 114.2 | 113.4 | 112.5 | 46 | |
| 8-48 | 45 | 122.5 | 121.8 | 121.1 | 120.4 | 119.7 | 119.0 | 118.2 | 117.5 | 116.7 | 115.9 | 115.1 | 114.3 | 113.5 | 112.7 | 111.8 | 45 | 3-12 |
| | 44 | 122.0 | 121.3 | 120.6 | 119.9 | 119.2 | 118.4 | 117.6 | 116.9 | 116.1 | 115.3 | 114.5 | 113.6 | 112.8 | 111.9 | 111.0 | 44 | |
| | 43 | 121.6 | 120.8 | 120.1 | 119.4 | 118.6 | 117.8 | 117.1 | 116.3 | 115.4 | 114.6 | 113.8 | 112.9 | 112.0 | 111.2 | 110.2 | 43 | |
| | 42 | 121.1 | 120.3 | 119.6 | 118.8 | 118.0 | 117.3 | 116.5 | 115.6 | 114.8 | 114.0 | 113.1 | 112.2 | 111.3 | 110.4 | 109.5 | 42 | |
| | 41 | 120.6 | 119.8 | 119.0 | 118.3 | 117.5 | 116.7 | 115.8 | 115.0 | 114.1 | 113.3 | 112.4 | 111.5 | 110.6 | 109.6 | 108.7 | 41 | |
| | 49 | 123.3 | 122.7 | 122.1 | 121.4 | 120.8 | 120.1 | 119.5 | 118.8 | 118.1 | 117.4 | 116.7 | 116.0 | 115.2 | 114.5 | 113.7 | 49 | |
| | 48 | 122.9 | 122.2 | 121.6 | 121.0 | 120.3 | 119.6 | 118.9 | 118.2 | 117.5 | 116.8 | 116.1 | 115.4 | 114.6 | 113.8 | 113.0 | 48 | |
| | 47 | 122.5 | 121.8 | 121.2 | 120.5 | 119.8 | 119.1 | 118.4 | 117.7 | 117.0 | 116.2 | 115.5 | 114.7 | 113.9 | 113.1 | 112.3 | 47 | |
| | 46 | 122.0 | 121.4 | 120.7 | 120.0 | 119.3 | 118.6 | 117.9 | 117.1 | 116.4 | 115.6 | 114.8 | 114.1 | 113.3 | 112.4 | 111.6 | 46 | |
| 8-44 | 45 | 121.6 | 120.9 | 120.2 | 119.5 | 118.8 | 118.1 | 117.3 | 116.6 | 115.8 | 115.0 | 114.2 | 113.4 | 112.6 | 111.7 | 110.9 | 45 | 3-16 |
| | 44 | 121.1 | 120.4 | 119.7 | 119.0 | 118.3 | 117.5 | 116.7 | 116.0 | 115.2 | 114.4 | 113.6 | 112.7 | 111.9 | 111.0 | 110.1 | 44 | |
| | 43 | 120.7 | 119.9 | 119.2 | 118.5 | 117.7 | 116.9 | 116.2 | 115.4 | 114.5 | 113.7 | 112.9 | 112.0 | 111.2 | 110.3 | 109.4 | 43 | |
| | 42 | 120.2 | 119.5 | 118.7 | 117.9 | 117.2 | 116.4 | 115.6 | 114.8 | 113.9 | 113.1 | 112.2 | 111.3 | 110.4 | 109.5 | 108.6 | 42 | |
| | 41 | 119.7 | 118.9 | 118.2 | 117.4 | 116.6 | 115.8 | 114.9 | 114.1 | 113.3 | 112.4 | 111.5 | 110.6 | 109.7 | 108.8 | 107.8 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

9 hrs. 16 m. to 8 hrs. 44 m. 2 hrs. 44 m. to 3 hrs. 16 m.

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 121.0 | 120.2 | 119.4 | 118.5 | 117.7 | 116.8 | 115.8 | 114.9 | 113.9 | 112.9 | 111.9 | 110.8 | 109.7 | 108.6 | 107.4 | 49 | |
| | 48 | 120.2 | 119.4 | 118.5 | 117.6 | 116.8 | 115.8 | 114.9 | 113.9 | 112.9 | 111.8 | 110.8 | 109.7 | 108.5 | 107.4 | 106.1 | 48 | |
| | 47 | 119.4 | 118.5 | 117.6 | 116.7 | 115.8 | 114.8 | 113.9 | 112.8 | 111.8 | 110.7 | 109.6 | 108.5 | 107.3 | 106.1 | 104.8 | 47 | |
| | 46 | 118.5 | 117.6 | 116.7 | 115.8 | 114.8 | 113.9 | 112.8 | 111.8 | 110.7 | 109.6 | 108.5 | 107.3 | 106.1 | 104.8 | 103.5 | 46 | |
| 9-16 | 45 | 117.7 | 116.8 | 115.8 | 114.8 | 113.9 | 112.8 | 111.8 | 110.7 | 109.6 | 108.4 | 107.3 | 106.1 | 104.8 | 103.5 | 102.2 | 45 | 2-44 |
| | 44 | 116.8 | 115.9 | 114.9 | 113.9 | 112.9 | 111.8 | 110.7 | 109.6 | 108.5 | 107.3 | 106.1 | 104.8 | 103.5 | 102.2 | 100.8 | 44 | |
| | 43 | 115.9 | 114.9 | 113.9 | 112.9 | 111.8 | 110.8 | 109.6 | 108.5 | 107.3 | 106.1 | 104.8 | 103.5 | 102.2 | 100.9 | 99.5 | 43 | |
| | 42 | 115.0 | 114.0 | 113.0 | 111.9 | 110.8 | 109.7 | 108.5 | 107.3 | 106.1 | 104.9 | 103.6 | 102.3 | 100.9 | 99.5 | 98.1 | 42 | |
| | 41 | 114.1 | 113.0 | 112.0 | 110.9 | 109.7 | 108.6 | 107.4 | 106.2 | 104.9 | 103.6 | 102.3 | 101.0 | 99.6 | 98.1 | 96.7 | 41 | |
| | 49 | 119.9 | 119.1 | 118.3 | 117.5 | 116.6 | 115.7 | 114.8 | 113.9 | 112.9 | 111.9 | 110.9 | 109.8 | 108.7 | 107.6 | 106.4 | 49 | |
| | 48 | 119.1 | 118.3 | 117.5 | 116.6 | 115.7 | 114.8 | 113.8 | 112.9 | 111.8 | 110.8 | 109.8 | 108.7 | 107.5 | 106.4 | 105.2 | 48 | |
| | 47 | 118.3 | 117.5 | 116.6 | 115.7 | 114.8 | 113.8 | 112.8 | 111.8 | 110.8 | 109.7 | 108.7 | 107.5 | 106.3 | 105.1 | 103.9 | 47 | |
| | 46 | 117.5 | 116.6 | 115.7 | 114.8 | 113.8 | 112.8 | 111.8 | 110.8 | 109.7 | 108.6 | 107.5 | 106.3 | 105.1 | 103.9 | 102.6 | 46 | |
| 9-12 | 45 | 116.7 | 115.8 | 114.8 | 113.8 | 112.9 | 111.8 | 110.8 | 109.7 | 108.6 | 107.5 | 106.3 | 105.1 | 103.9 | 102.6 | 101.3 | 45 | 2-48 |
| | 44 | 115.8 | 114.9 | 113.9 | 112.9 | 111.9 | 110.8 | 109.7 | 108.6 | 107.5 | 106.3 | 105.1 | 103.9 | 102.6 | 101.3 | 100.0 | 44 | |
| | 43 | 114.9 | 113.9 | 112.9 | 111.9 | 110.9 | 109.8 | 108.7 | 107.5 | 106.4 | 105.2 | 103.9 | 102.6 | 101.3 | 100.0 | 98.6 | 43 | |
| | 42 | 114.0 | 113.0 | 112.0 | 110.9 | 109.8 | 108.7 | 107.6 | 106.4 | 105.2 | 104.0 | 102.7 | 101.4 | 100.1 | 98.7 | 97.3 | 42 | |
| | 41 | 113.1 | 112.1 | 111.0 | 109.9 | 108.8 | 107.7 | 106.5 | 105.3 | 104.0 | 102.8 | 101.5 | 100.1 | 98.8 | 97.3 | 95.9 | 41 | |
| | 49 | 118.9 | 118.1 | 117.3 | 116.4 | 115.6 | 114.7 | 113.7 | 112.8 | 111.9 | 110.9 | 109.8 | 108.8 | 107.7 | 106.6 | 105.4 | 49 | |
| | 48 | 118.1 | 117.3 | 116.4 | 115.6 | 114.7 | 113.8 | 112.8 | 111.8 | 110.8 | 109.8 | 108.7 | 107.7 | 106.5 | 105.4 | 104.2 | 48 | |
| | 47 | 117.3 | 116.5 | 115.6 | 114.7 | 113.8 | 112.8 | 111.8 | 110.8 | 109.8 | 108.7 | 107.6 | 106.5 | 105.4 | 104.2 | 103.0 | 47 | |
| | 46 | 116.5 | 115.6 | 114.7 | 113.8 | 112.8 | 111.8 | 110.8 | 109.8 | 108.7 | 107.6 | 106.5 | 105.4 | 104.2 | 102.9 | 101.7 | 46 | |
| 9-08 | 45 | 115.7 | 114.8 | 113.8 | 112.9 | 111.9 | 110.9 | 109.8 | 108.8 | 107.7 | 106.5 | 105.4 | 104.2 | 103.0 | 101.7 | 100.4 | 45 | 2-52 |
| | 44 | 114.8 | 113.9 | 112.9 | 111.9 | 110.9 | 109.9 | 108.8 | 107.7 | 106.6 | 105.4 | 104.2 | 103.0 | 101.7 | 100.4 | 99.1 | 44 | |
| | 43 | 113.9 | 113.0 | 112.0 | 111.0 | 109.9 | 108.8 | 107.7 | 106.6 | 105.5 | 104.2 | 103.0 | 101.8 | 100.5 | 99.2 | 97.8 | 43 | |
| | 42 | 113.1 | 112.0 | 111.0 | 110.0 | 108.9 | 107.8 | 106.7 | 105.5 | 104.3 | 103.1 | 101.8 | 100.5 | 99.2 | 97.9 | 96.5 | 42 | |
| | 41 | 112.2 | 111.1 | 110.1 | 109.0 | 107.9 | 106.7 | 105.6 | 104.4 | 103.2 | 101.9 | 100.6 | 99.3 | 98.0 | 96.6 | 95.2 | 41 | |
| | 49 | 117.9 | 117.1 | 116.2 | 115.4 | 114.5 | 113.7 | 112.7 | 111.8 | 110.9 | 109.9 | 108.8 | 107.8 | 106.7 | 105.6 | 104.5 | 49 | |
| | 48 | 117.1 | 116.3 | 115.4 | 114.5 | 113.6 | 112.7 | 111.8 | 110.8 | 109.8 | 108.8 | 107.8 | 106.7 | 105.6 | 104.4 | 103.2 | 48 | |
| | 47 | 116.3 | 115.4 | 114.6 | 113.7 | 112.8 | 111.8 | 110.9 | 109.8 | 108.8 | 107.8 | 106.7 | 105.6 | 104.4 | 103.2 | 102.0 | 47 | |
| | 46 | 115.5 | 114.6 | 113.7 | 112.8 | 111.8 | 110.8 | 109.8 | 108.8 | 107.8 | 106.7 | 105.6 | 104.4 | 103.2 | 102.0 | 100.8 | 46 | |
| 9-04 | 45 | 114.7 | 113.8 | 112.8 | 111.9 | 110.9 | 109.9 | 108.9 | 107.8 | 106.7 | 105.6 | 104.4 | 103.3 | 102.1 | 100.8 | 99.5 | 45 | 2-56 |
| | 44 | 113.9 | 112.9 | 111.9 | 110.9 | 110.0 | 108.9 | 107.8 | 106.8 | 105.7 | 104.5 | 103.3 | 102.1 | 100.9 | 99.6 | 98.3 | 44 | |
| | 43 | 113.0 | 112.0 | 111.0 | 110.0 | 109.0 | 107.9 | 106.8 | 105.7 | 104.6 | 103.4 | 102.2 | 100.9 | 99.6 | 98.3 | 97.0 | 43 | |
| | 42 | 112.1 | 111.1 | 110.1 | 109.1 | 108.0 | 106.9 | 105.8 | 104.6 | 103.4 | 102.2 | 101.0 | 99.7 | 98.4 | 97.1 | 95.7 | 42 | |
| | 41 | 111.2 | 110.2 | 109.2 | 108.1 | 107.0 | 105.9 | 104.7 | 103.5 | 102.3 | 101.1 | 99.8 | 98.5 | 97.2 | 95.8 | 94.4 | 41 | |
| | 49 | 116.9 | 116.1 | 115.2 | 114.4 | 113.5 | 112.6 | 111.7 | 110.8 | 109.9 | 108.9 | 107.9 | 106.8 | 105.8 | 104.7 | 103.5 | 49 | |
| | 48 | 116.1 | 115.3 | 114.4 | 113.5 | 112.7 | 111.7 | 110.8 | 109.8 | 108.9 | 107.8 | 106.8 | 105.7 | 104.6 | 103.5 | 102.3 | 48 | |
| | 47 | 115.3 | 114.5 | 113.6 | 112.7 | 111.8 | 110.8 | 109.9 | 108.9 | 107.9 | 106.8 | 105.7 | 104.6 | 103.5 | 102.3 | 101.2 | 47 | |
| | 46 | 114.5 | 113.6 | 112.7 | 111.8 | 110.9 | 109.9 | 108.9 | 107.9 | 106.8 | 105.8 | 104.6 | 103.5 | 102.4 | 101.2 | 99.9 | 46 | |
| 9-00 | 45 | 113.7 | 112.8 | 111.9 | 110.9 | 109.9 | 108.9 | 107.9 | 106.9 | 105.8 | 104.7 | 103.5 | 102.4 | 101.2 | 100.0 | 98.7 | 45 | 3-00 |
| | 44 | 112.9 | 112.0 | 111.0 | 110.0 | 109.0 | 108.0 | 106.9 | 105.8 | 104.7 | 103.6 | 102.4 | 101.2 | 100.0 | 98.7 | 97.5 | 44 | |
| | 43 | 112.0 | 111.1 | 110.1 | 109.1 | 108.1 | 107.0 | 105.9 | 104.8 | 103.7 | 102.5 | 101.3 | 100.1 | 98.8 | 97.5 | 96.2 | 43 | |
| | 42 | 111.2 | 110.2 | 109.2 | 108.1 | 107.1 | 106.0 | 104.9 | 103.7 | 102.6 | 101.4 | 100.2 | 98.9 | 97.6 | 96.3 | 95.0 | 42 | |
| | 41 | 110.3 | 109.3 | 108.3 | 107.2 | 106.1 | 105.0 | 103.8 | 102.7 | 101.5 | 100.3 | 99.0 | 97.7 | 96.4 | 95.1 | 93.7 | 41 | |
| | 49 | 115.9 | 115.1 | 114.2 | 113.4 | 112.5 | 111.7 | 110.8 | 109.8 | 108.9 | 107.9 | 106.9 | 105.9 | 104.8 | 103.7 | 102.6 | 49 | |
| | 48 | 115.1 | 114.3 | 113.4 | 112.6 | 111.7 | 110.8 | 109.8 | 108.9 | 107.9 | 106.9 | 105.8 | 104.8 | 103.7 | 102.6 | 101.4 | 48 | |
| | 47 | 114.3 | 113.5 | 112.6 | 111.7 | 110.9 | 109.9 | 108.9 | 107.9 | 106.9 | 105.9 | 104.8 | 103.7 | 102.6 | 101.4 | 100.2 | 47 | |
| | 46 | 113.6 | 112.7 | 111.8 | 110.9 | 109.9 | 108.9 | 107.9 | 106.9 | 105.9 | 104.8 | 103.7 | 102.6 | 101.4 | 100.3 | 99.1 | 46 | |
| 8-56 | 45 | 112.8 | 111.9 | 110.9 | 110.0 | 109.0 | 108.0 | 107.0 | 106.0 | 104.9 | 103.8 | 102.7 | 101.5 | 100.3 | 99.1 | 97.9 | 45 | 3-04 |
| | 44 | 112.0 | 111.0 | 110.1 | 109.1 | 108.1 | 107.1 | 106.0 | 104.9 | 103.8 | 102.7 | 101.6 | 100.4 | 99.2 | 97.9 | 96.6 | 44 | |
| | 43 | 111.1 | 110.2 | 109.2 | 108.2 | 107.2 | 106.1 | 105.0 | 103.9 | 102.8 | 101.6 | 100.5 | 99.2 | 98.0 | 96.7 | 95.4 | 43 | |
| | 42 | 110.3 | 109.3 | 108.3 | 107.3 | 106.2 | 105.1 | 104.0 | 102.9 | 101.7 | 100.5 | 99.3 | 98.1 | 96.8 | 95.5 | 94.2 | 42 | |
| | 41 | 109.4 | 108.4 | 107.4 | 106.3 | 105.2 | 104.1 | 103.0 | 101.8 | 100.7 | 99.4 | 98.2 | 96.9 | 95.7 | 94.3 | 93.0 | 41 | |
| | 49 | 114.9 | 114.1 | 113.3 | 112.4 | 111.6 | 110.7 | 109.8 | 108.9 | 107.9 | 106.9 | 105.9 | 104.9 | 103.9 | 102.8 | 101.7 | 49 | |
| | 48 | 114.1 | 113.3 | 112.5 | 111.6 | 110.7 | 109.8 | 108.9 | 107.9 | 107.0 | 105.9 | 104.9 | 103.9 | 102.8 | 101.7 | 100.5 | 48 | |
| | 47 | 113.4 | 112.5 | 111.6 | 110.8 | 109.9 | 108.9 | 108.0 | 107.0 | 106.0 | 104.9 | 103.9 | 102.8 | 101.7 | 100.5 | 99.4 | 47 | |
| | 46 | 112.6 | 111.7 | 110.8 | 109.9 | 109.0 | 108.0 | 107.0 | 106.0 | 105.0 | 103.9 | 102.8 | 101.7 | 100.6 | 99.4 | 98.2 | 46 | |
| 8-52 | 45 | 111.8 | 110.9 | 110.0 | 109.1 | 108.1 | 107.1 | 106.1 | 105.1 | 104.0 | 102.9 | 101.8 | 100.6 | 99.5 | 98.3 | 97.0 | 45 | 3-08 |
| | 44 | 111.0 | 110.1 | 109.1 | 108.2 | 107.2 | 106.2 | 105.1 | 104.1 | 103.0 | 101.9 | 100.7 | 99.5 | 98.3 | 97.1 | 95.9 | 44 | |
| | 43 | 110.1 | 109.3 | 108.3 | 107.3 | 106.3 | 105.2 | 104.2 | 103.1 | 102.0 | 100.8 | 99.6 | 98.4 | 97.2 | 96.0 | 94.7 | 43 | |
| | 42 | 109.4 | 108.4 | 107.4 | 106.4 | 105.3 | 104.3 | 103.2 | 102.0 | 100.9 | 99.7 | 98.5 | 97.3 | 96.1 | 94.8 | 93.5 | 42 | |
| | 41 | 108.6 | 107.6 | 106.5 | 105.5 | 104.4 | 103.3 | 102.2 | 101.0 | 99.9 | 98.7 | 97.4 | 96.2 | 94.9 | 93.6 | 92.3 | 41 | |
| | 49 | 113.9 | 113.1 | 112.3 | 111.5 | 110.6 | 109.7 | 108.8 | 107.9 | 107.0 | 106.0 | 105.0 | 104.0 | 102.9 | 101.9 | 100.8 | 49 | |
| | 48 | 113.2 | 112.4 | 111.5 | 110.6 | 109.8 | 108.9 | 107.9 | 107.0 | 106.0 | 105.0 | 104.0 | 103.0 | 101.9 | 100.8 | 99.7 | 48 | |
| | 47 | 112.4 | 111.6 | 110.7 | 109.8 | 108.9 | 108.0 | 107.0 | 106.0 | 105.0 | 104.0 | 103.0 | 101.9 | 100.8 | 99.7 | 98.5 | 47 | |
| | 46 | 111.7 | 110.8 | 109.9 | 109.0 | 108.1 | 107.1 | 106.1 | 105.1 | 104.1 | 103.0 | 102.0 | 100.9 | 99.7 | 98.6 | 97.4 | 46 | |
| 8-48 | 45 | 110.9 | 110.0 | 109.1 | 108.1 | 107.2 | 106.2 | 105.2 | 104.2 | 103.1 | 102.0 | 100.9 | 99.8 | 98.6 | 97.4 | 96.2 | 45 | 3-12 |
| | 44 | 110.1 | 109.2 | 108.2 | 107.3 | 106.3 | 105.3 | 104.3 | 103.2 | 102.1 | 101.0 | 99.9 | 98.7 | 97.5 | 96.3 | 95.1 | 44 | |
| | 43 | 109.3 | 108.4 | 107.4 | 106.4 | 105.4 | 104.4 | 103.3 | 102.2 | 101.1 | 100.0 | 98.8 | 97.6 | 96.4 | 95.2 | 93.9 | 43 | |
| | 42 | 108.5 | 107.5 | 106.5 | 105.5 | 104.5 | 103.4 | 102.3 | 101.2 | 100.1 | 98.9 | 97.8 | 96.5 | 95.3 | 94.0 | 92.8 | 42 | |
| | 41 | 107.7 | 106.7 | 105.7 | 104.6 | 103.6 | 102.5 | 101.4 | 100.3 | 99.1 | 97.9 | 96.7 | 95.4 | 94.2 | 92.9 | 91.6 | 41 | |
| | 49 | 113.0 | 112.1 | 111.3 | 110.5 | 109.6 | 108.8 | 107.9 | 107.0 | 106.0 | 105.0 | 104.1 | 103.1 | 102.0 | 101.0 | 99.9 | 49 | |
| | 48 | 112.2 | 111.4 | 110.6 | 109.7 | 108.8 | 107.9 | 107.0 | 106.1 | 105.1 | 104.1 | 103.1 | 102.1 | 101.0 | 99.9 | 98.8 | 48 | |
| | 47 | 111.5 | 110.6 | 109.8 | 108.9 | 108.0 | 107.1 | 106.1 | 105.1 | 104.1 | 103.1 | 102.1 | 101.0 | 99.9 | 98.8 | 97.7 | 47 | |
| | 46 | 110.8 | 109.9 | 109.0 | 108.1 | 107.2 | 106.2 | 105.2 | 104.2 | 103.2 | 102.2 | 101.1 | 100.0 | 98.9 | 97.7 | 96.6 | 46 | |
| 8-44 | 45 | 110.0 | 109.1 | 108.2 | 107.2 | 106.3 | 105.3 | 104.3 | 103.3 | 102.3 | 101.2 | 100.1 | 99.0 | 97.8 | 96.6 | 95.4 | 45 | 3-16 |
| | 44 | 109.2 | 108.3 | 107.4 | 106.4 | 105.4 | 104.4 | 103.4 | 102.3 | 101.3 | 100.2 | 99.1 | 97.9 | 96.7 | 95.5 | 94.3 | 44 | |
| | 43 | 108.4 | 107.5 | 106.5 | 105.5 | 104.5 | 103.5 | 102.5 | 101.4 | 100.3 | 99.2 | 98.0 | 96.9 | 95.7 | 94.4 | 93.2 | 43 | |
| | 42 | 107.6 | 106.7 | 105.7 | 104.7 | 103.7 | 102.6 | 101.5 | 100.4 | 99.3 | 98.2 | 97.0 | 95.8 | 94.6 | 93.3 | 92.1 | 42 | |
| | 41 | 106.8 | 105.8 | 104.8 | 103.8 | 102.7 | 101.7 | 100.6 | 99.4 | 98.3 | 97.1 | 95.9 | 94.7 | 93.5 | 92.2 | 90.9 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A.M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 123.3 | 122.7 | 122.1 | 121.4 | 120.8 | 120.1 | 119.5 | 118.8 | 118.1 | 117.4 | 116.7 | 116.0 | 115.2 | 114.5 | 113.7 | 49 | |
| | 48 | 122.9 | 122.2 | 121.6 | 121.0 | 120.3 | 119.6 | 118.9 | 118.2 | 117.5 | 116.8 | 116.1 | 115.4 | 114.6 | 113.8 | 113.0 | 48 | |
| | 47 | 122.5 | 121.8 | 121.2 | 120.5 | 119.8 | 119.1 | 118.4 | 117.7 | 117.0 | 116.2 | 115.5 | 114.7 | 113.9 | 113.1 | 112.3 | 47 | |
| | 46 | 122.0 | 121.4 | 120.7 | 120.0 | 119.3 | 118.6 | 117.9 | 117.1 | 116.4 | 115.6 | 114.8 | 114.1 | 113.3 | 112.4 | 111.6 | 46 | |
| 8-44 | 45 | 121.6 | 120.9 | 120.2 | 119.5 | 118.8 | 118.1 | 117.3 | 116.6 | 115.8 | 115.0 | 114.2 | 113.4 | 112.6 | 111.7 | 110.9 | 45 | 3-16 |
| | 44 | 121.1 | 120.4 | 119.7 | 119.0 | 118.3 | 117.5 | 116.7 | 116.0 | 115.2 | 114.4 | 113.6 | 112.7 | 111.9 | 111.0 | 110.1 | 44 | |
| | 43 | 120.7 | 119.9 | 119.2 | 118.5 | 117.7 | 116.9 | 116.2 | 115.4 | 114.5 | 113.7 | 112.9 | 112.0 | 111.2 | 110.3 | 109.4 | 43 | |
| | 42 | 120.2 | 119.5 | 118.7 | 117.9 | 117.2 | 116.4 | 115.6 | 114.8 | 113.9 | 113.1 | 112.2 | 111.3 | 110.4 | 109.5 | 108.6 | 42 | |
| | 41 | 119.7 | 118.9 | 118.2 | 117.4 | 116.6 | 115.8 | 114.9 | 114.1 | 113.3 | 112.4 | 111.5 | 110.6 | 109.7 | 108.8 | 107.8 | 41 | |
| | 49 | 122.4 | 121.7 | 121.1 | 120.5 | 119.8 | 119.2 | 118.5 | 117.8 | 117.2 | 116.5 | 115.8 | 115.0 | 114.3 | 113.5 | 112.8 | 49 | |
| | 48 | 122.0 | 121.3 | 120.7 | 120.0 | 119.4 | 118.7 | 118.0 | 117.3 | 116.6 | 115.9 | 115.2 | 114.4 | 113.7 | 112.9 | 112.1 | 48 | |
| | 47 | 121.5 | 120.9 | 120.2 | 119.6 | 118.9 | 118.2 | 117.5 | 116.8 | 116.0 | 115.3 | 114.6 | 113.8 | 113.0 | 112.2 | 111.4 | 47 | |
| | 46 | 121.1 | 120.5 | 119.8 | 119.1 | 118.4 | 117.7 | 117.0 | 116.2 | 115.5 | 114.7 | 113.9 | 113.1 | 112.3 | 111.5 | 110.7 | 46 | |
| 8-40 | 45 | 120.7 | 120.0 | 119.3 | 118.6 | 117.9 | 117.1 | 116.4 | 115.7 | 114.9 | 114.1 | 113.3 | 112.5 | 111.7 | 110.8 | 110.0 | 45 | 3-20 |
| | 44 | 120.2 | 119.5 | 118.8 | 118.1 | 117.4 | 116.6 | 115.8 | 115.1 | 114.3 | 113.5 | 112.7 | 111.8 | 111.0 | 110.1 | 109.2 | 44 | |
| | 43 | 119.8 | 119.1 | 118.3 | 117.6 | 116.8 | 116.1 | 115.3 | 114.5 | 113.7 | 112.8 | 112.0 | 111.1 | 110.3 | 109.4 | 108.5 | 43 | |
| | 42 | 119.3 | 118.6 | 117.8 | 117.1 | 116.3 | 115.5 | 114.7 | 113.9 | 113.0 | 112.2 | 111.3 | 110.5 | 109.6 | 108.7 | 107.7 | 42 | |
| | 41 | 118.8 | 118.1 | 117.3 | 116.5 | 115.7 | 114.9 | 114.1 | 113.3 | 112.4 | 111.5 | 110.7 | 109.8 | 108.8 | 107.9 | 107.0 | 41 | |
| | 49 | 121.4 | 120.8 | 120.2 | 119.6 | 118.9 | 118.3 | 117.6 | 116.9 | 116.2 | 115.5 | 114.8 | 114.1 | 113.4 | 112.6 | 111.8 | 49 | |
| | 48 | 121.0 | 120.4 | 119.8 | 119.1 | 118.4 | 117.8 | 117.1 | 116.4 | 115.7 | 115.0 | 114.2 | 113.5 | 112.7 | 112.0 | 111.2 | 48 | |
| | 47 | 120.6 | 120.0 | 119.3 | 118.7 | 118.0 | 117.3 | 116.6 | 115.9 | 115.1 | 114.4 | 113.6 | 112.9 | 112.1 | 111.3 | 110.5 | 47 | |
| | 46 | 120.2 | 119.6 | 118.9 | 118.2 | 117.5 | 116.8 | 116.0 | 115.3 | 114.6 | 113.8 | 113.0 | 112.2 | 111.4 | 110.6 | 109.8 | 46 | |
| 8-36 | 45 | 119.8 | 119.1 | 118.4 | 117.7 | 117.0 | 116.3 | 115.5 | 114.8 | 114.0 | 113.2 | 112.4 | 111.6 | 110.8 | 109.9 | 109.1 | 45 | 3-24 |
| | 44 | 119.4 | 118.7 | 117.9 | 117.2 | 116.5 | 115.7 | 115.0 | 114.2 | 113.4 | 112.6 | 111.8 | 110.9 | 110.1 | 109.2 | 108.4 | 44 | |
| | 43 | 118.9 | 118.2 | 117.5 | 116.7 | 115.9 | 115.2 | 114.4 | 113.6 | 112.8 | 112.0 | 111.1 | 110.3 | 109.4 | 108.5 | 107.6 | 43 | |
| | 42 | 118.5 | 117.7 | 117.0 | 116.2 | 115.4 | 114.6 | 113.8 | 113.0 | 112.2 | 111.3 | 110.5 | 109.6 | 108.7 | 107.8 | 106.9 | 42 | |
| | 41 | 118.0 | 117.2 | 116.4 | 115.7 | 114.9 | 114.1 | 113.2 | 112.4 | 111.5 | 110.7 | 109.8 | 108.9 | 108.0 | 107.1 | 106.1 | 41 | |
| | 49 | 120.5 | 119.9 | 119.3 | 118.6 | 118.0 | 117.3 | 116.7 | 116.0 | 115.3 | 114.6 | 113.9 | 113.2 | 112.4 | 111.7 | 110.9 | 49 | |
| | 48 | 120.1 | 119.5 | 118.9 | 118.2 | 117.5 | 116.9 | 116.2 | 115.5 | 114.8 | 114.0 | 113.3 | 112.6 | 111.8 | 111.0 | 110.3 | 48 | |
| | 47 | 119.8 | 119.1 | 118.4 | 117.8 | 117.1 | 116.4 | 115.7 | 115.0 | 114.2 | 113.5 | 112.7 | 112.0 | 111.2 | 110.4 | 109.6 | 47 | |
| | 46 | 119.3 | 118.7 | 118.0 | 117.3 | 116.6 | 115.9 | 115.1 | 114.4 | 113.7 | 112.9 | 112.1 | 111.3 | 110.5 | 109.7 | 108.9 | 46 | |
| 8-32 | 45 | 118.9 | 118.2 | 117.5 | 116.8 | 116.1 | 115.4 | 114.6 | 113.9 | 113.1 | 112.3 | 111.5 | 110.7 | 109.9 | 109.1 | 108.2 | 45 | 3-28 |
| | 44 | 118.5 | 117.8 | 117.1 | 116.3 | 115.6 | 114.9 | 114.1 | 113.3 | 112.5 | 111.7 | 110.9 | 110.1 | 109.2 | 108.4 | 107.5 | 44 | |
| | 43 | 118.1 | 117.3 | 116.6 | 115.8 | 115.1 | 114.3 | 113.5 | 112.7 | 111.9 | 111.1 | 110.3 | 109.4 | 108.6 | 107.7 | 106.8 | 43 | |
| | 42 | 117.6 | 116.9 | 116.1 | 115.4 | 114.6 | 113.8 | 113.0 | 112.2 | 111.3 | 110.5 | 109.6 | 108.8 | 107.9 | 107.0 | 106.1 | 42 | |
| | 41 | 117.1 | 116.4 | 115.6 | 114.8 | 114.0 | 113.2 | 112.4 | 111.6 | 110.7 | 109.9 | 109.0 | 108.1 | 107.2 | 106.3 | 105.3 | 41 | |
| | 49 | 119.6 | 119.0 | 118.4 | 117.7 | 117.1 | 116.4 | 115.8 | 115.1 | 114.4 | 113.7 | 113.0 | 112.3 | 111.5 | 110.8 | 110.0 | 49 | |
| | 48 | 119.3 | 118.6 | 118.0 | 117.3 | 116.6 | 116.0 | 115.3 | 114.6 | 113.9 | 113.1 | 112.4 | 111.7 | 110.9 | 110.1 | 109.4 | 48 | |
| | 47 | 118.9 | 118.2 | 117.6 | 116.9 | 116.2 | 115.5 | 114.8 | 114.1 | 113.3 | 112.6 | 111.8 | 111.1 | 110.3 | 109.5 | 108.7 | 47 | |
| | 46 | 118.5 | 117.8 | 117.1 | 116.4 | 115.7 | 115.0 | 114.3 | 113.5 | 112.8 | 112.0 | 111.2 | 110.5 | 109.7 | 108.8 | 108.0 | 46 | |
| 8-28 | 45 | 118.1 | 117.4 | 116.7 | 116.0 | 115.2 | 114.5 | 113.8 | 113.0 | 112.2 | 111.4 | 110.6 | 109.8 | 109.0 | 108.2 | 107.3 | 45 | 3-32 |
| | 44 | 117.6 | 116.9 | 116.2 | 115.5 | 114.7 | 114.0 | 113.2 | 112.4 | 111.7 | 110.9 | 110.0 | 109.2 | 108.4 | 107.5 | 106.6 | 44 | |
| | 43 | 117.2 | 116.5 | 115.7 | 115.0 | 114.2 | 113.5 | 112.7 | 111.9 | 111.1 | 110.2 | 109.4 | 108.6 | 107.7 | 106.8 | 105.9 | 43 | |
| | 42 | 116.8 | 116.0 | 115.3 | 114.5 | 113.7 | 112.9 | 112.1 | 111.3 | 110.5 | 109.7 | 108.8 | 107.9 | 107.0 | 106.1 | 105.2 | 42 | |
| | 41 | 116.3 | 115.5 | 114.8 | 114.0 | 113.2 | 112.4 | 111.6 | 110.7 | 109.9 | 109.0 | 108.2 | 107.3 | 106.4 | 105.4 | 104.5 | 41 | |
| | 49 | 118.8 | 118.1 | 117.5 | 116.8 | 116.2 | 115.5 | 114.8 | 114.2 | 113.5 | 112.8 | 112.1 | 111.3 | 110.6 | 109.9 | 109.1 | 49 | |
| | 48 | 118.4 | 117.7 | 117.1 | 116.4 | 115.7 | 115.1 | 114.4 | 113.7 | 113.0 | 112.2 | 111.5 | 110.8 | 110.0 | 109.3 | 108.5 | 48 | |
| | 47 | 118.0 | 117.3 | 116.7 | 116.0 | 115.3 | 114.6 | 113.9 | 113.2 | 112.4 | 111.7 | 110.9 | 110.2 | 109.4 | 108.6 | 107.8 | 47 | |
| | 46 | 117.6 | 116.9 | 116.2 | 115.5 | 114.8 | 114.1 | 113.4 | 112.6 | 111.9 | 111.1 | 110.4 | 109.6 | 108.8 | 108.0 | 107.2 | 46 | |
| 8-24 | 45 | 117.2 | 116.5 | 115.8 | 115.1 | 114.4 | 113.6 | 112.9 | 112.1 | 111.4 | 110.6 | 109.8 | 109.0 | 108.2 | 107.3 | 106.5 | 45 | 3-36 |
| | 44 | 116.8 | 116.1 | 115.4 | 114.6 | 113.9 | 113.1 | 112.4 | 111.6 | 110.8 | 110.0 | 109.2 | 108.4 | 107.5 | 106.7 | 105.8 | 44 | |
| | 43 | 116.4 | 115.6 | 114.9 | 114.1 | 113.4 | 112.6 | 111.8 | 111.0 | 110.2 | 109.4 | 108.6 | 107.7 | 106.9 | 106.0 | 105.1 | 43 | |
| | 42 | 115.9 | 115.2 | 114.4 | 113.7 | 112.9 | 112.1 | 111.3 | 110.5 | 109.7 | 108.8 | 108.0 | 107.1 | 106.2 | 105.3 | 104.4 | 42 | |
| | 41 | 115.5 | 114.7 | 113.9 | 113.2 | 112.4 | 111.6 | 110.7 | 109.9 | 109.1 | 108.2 | 107.3 | 106.5 | 105.6 | 104.6 | 103.7 | 41 | |
| | 49 | 117.9 | 117.2 | 116.6 | 116.0 | 115.3 | 114.6 | 114.0 | 113.3 | 112.6 | 111.9 | 111.2 | 110.5 | 109.7 | 109.0 | 108.2 | 49 | |
| | 48 | 117.5 | 116.8 | 116.2 | 115.5 | 114.9 | 114.2 | 113.5 | 112.8 | 112.1 | 111.4 | 110.6 | 109.9 | 109.1 | 108.4 | 107.6 | 48 | |
| | 47 | 117.1 | 116.5 | 115.8 | 115.1 | 114.4 | 113.7 | 113.0 | 112.3 | 111.6 | 110.8 | 110.1 | 109.3 | 108.5 | 107.7 | 106.9 | 47 | |
| | 46 | 116.7 | 116.1 | 115.4 | 114.7 | 114.0 | 113.3 | 112.5 | 111.8 | 111.0 | 110.3 | 109.5 | 108.7 | 107.9 | 107.1 | 106.3 | 46 | |
| 8-20 | 45 | 116.3 | 115.7 | 114.9 | 114.2 | 113.5 | 112.8 | 112.0 | 111.3 | 110.5 | 109.7 | 108.9 | 108.1 | 107.3 | 106.5 | 105.6 | 45 | 3-40 |
| | 44 | 115.9 | 115.2 | 114.5 | 113.8 | 113.0 | 112.3 | 111.5 | 110.7 | 110.0 | 109.2 | 108.4 | 107.5 | 106.7 | 105.8 | 105.0 | 44 | |
| | 43 | 115.5 | 114.8 | 114.1 | 113.3 | 112.6 | 111.8 | 111.0 | 110.2 | 109.4 | 108.6 | 107.8 | 106.9 | 106.1 | 105.2 | 104.3 | 43 | |
| | 42 | 115.1 | 114.4 | 113.6 | 112.8 | 112.1 | 111.3 | 110.5 | 109.7 | 108.8 | 108.0 | 107.2 | 106.3 | 105.4 | 104.5 | 103.6 | 42 | |
| | 41 | 114.7 | 113.9 | 113.1 | 112.4 | 111.6 | 110.8 | 109.9 | 109.1 | 108.3 | 107.4 | 106.5 | 105.7 | 104.8 | 103.9 | 102.9 | 41 | |
| | 49 | 117.0 | 116.4 | 115.7 | 115.1 | 114.4 | 113.8 | 113.1 | 112.4 | 111.7 | 111.0 | 110.3 | 109.6 | 108.8 | 108.1 | 107.3 | 49 | |
| | 48 | 116.6 | 116.0 | 115.3 | 114.7 | 114.0 | 113.3 | 112.6 | 111.9 | 111.2 | 110.5 | 109.7 | 109.0 | 108.3 | 107.5 | 106.7 | 48 | |
| | 47 | 116.3 | 115.6 | 114.9 | 114.3 | 113.6 | 112.9 | 112.2 | 111.4 | 110.7 | 110.0 | 109.2 | 108.4 | 107.7 | 106.9 | 106.1 | 47 | |
| | 46 | 115.9 | 115.2 | 114.5 | 113.8 | 113.1 | 112.4 | 111.7 | 110.9 | 110.2 | 109.4 | 108.7 | 107.9 | 107.1 | 106.3 | 105.4 | 46 | |
| 8-16 | 45 | 115.5 | 114.8 | 114.1 | 113.4 | 112.7 | 111.9 | 111.2 | 110.4 | 109.7 | 108.9 | 108.1 | 107.3 | 106.5 | 105.6 | 104.8 | 45 | 3-44 |
| | 44 | 115.1 | 114.4 | 113.7 | 112.9 | 112.2 | 111.5 | 110.7 | 109.9 | 109.1 | 108.3 | 107.5 | 106.7 | 105.9 | 105.0 | 104.2 | 44 | |
| | 43 | 114.7 | 114.0 | 113.2 | 112.5 | 111.7 | 111.0 | 110.2 | 109.4 | 108.6 | 107.8 | 106.9 | 106.1 | 105.2 | 104.4 | 103.5 | 43 | |
| | 42 | 114.3 | 113.5 | 112.8 | 112.0 | 111.3 | 110.5 | 109.7 | 108.9 | 108.0 | 107.2 | 106.4 | 105.5 | 104.6 | 103.7 | 102.8 | 42 | |
| | 41 | 113.9 | 113.1 | 112.3 | 111.5 | 110.7 | 109.9 | 109.1 | 108.3 | 107.5 | 106.6 | 105.7 | 104.9 | 104.0 | 103.1 | 102.2 | 41 | |
| | 49 | 116.1 | 115.5 | 114.8 | 114.2 | 113.5 | 112.9 | 112.2 | 111.5 | 110.8 | 110.1 | 109.4 | 108.7 | 108.0 | 107.2 | 106.4 | 49 | |
| | 48 | 115.8 | 115.1 | 114.5 | 113.8 | 113.1 | 112.4 | 111.7 | 111.0 | 110.3 | 109.6 | 108.9 | 108.1 | 107.4 | 106.6 | 105.8 | 48 | |
| | 47 | 115.4 | 114.8 | 114.1 | 113.4 | 112.7 | 112.0 | 111.3 | 110.6 | 109.8 | 109.1 | 108.4 | 107.6 | 106.8 | 106.0 | 105.2 | 47 | |
| | 46 | 115.0 | 114.4 | 113.7 | 113.0 | 112.2 | 111.5 | 110.8 | 110.1 | 109.3 | 108.6 | 107.8 | 107.0 | 106.2 | 105.4 | 104.6 | 46 | |
| 8-12 | 45 | 114.7 | 114.0 | 113.3 | 112.6 | 111.8 | 111.1 | 110.4 | 109.6 | 108.8 | 108.0 | 107.3 | 106.5 | 105.6 | 104.8 | 104.0 | 45 | 3-48 |
| | 44 | 114.3 | 113.6 | 112.8 | 112.1 | 111.4 | 110.6 | 109.9 | 109.1 | 108.3 | 107.5 | 106.7 | 105.9 | 105.1 | 104.2 | 103.4 | 44 | |
| | 43 | 113.9 | 113.2 | 112.4 | 111.7 | 110.9 | 110.1 | 109.4 | 108.6 | 107.8 | 107.0 | 106.1 | 105.3 | 104.4 | 103.6 | 102.7 | 43 | |
| | 42 | 113.5 | 112.7 | 112.0 | 111.2 | 110.4 | 109.7 | 108.9 | 108.1 | 107.2 | 106.4 | 105.6 | 104.7 | 103.8 | 103.0 | 102.1 | 42 | |
| | 41 | 113.1 | 112.3 | 111.5 | 110.8 | 110.0 | 109.2 | 108.3 | 107.5 | 106.7 | 105.8 | 105.0 | 104.1 | 103.2 | 102.3 | 101.4 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 113.0 | 112.1 | 111.3 | 110.5 | 109.6 | 108.8 | 107.9 | 107.0 | 106.0 | 105.0 | 104.1 | 103.1 | 102.0 | 101.0 | 99.9 | 49 | |
| | 48 | 112.2 | 111.4 | 110.6 | 109.7 | 108.8 | 107.9 | 107.0 | 106.1 | 105.1 | 104.1 | 103.1 | 102.1 | 101.0 | 99.9 | 98.8 | 48 | |
| | 47 | 111.5 | 110.6 | 109.8 | 108.9 | 108.0 | 107.1 | 106.1 | 105.1 | 104.1 | 103.1 | 102.1 | 101.0 | 99.9 | 98.8 | 97.7 | 47 | |
| | 46 | 110.8 | 109.9 | 109.0 | 108.1 | 107.2 | 106.2 | 105.2 | 104.2 | 103.2 | 102.2 | 101.1 | 100.0 | 98.9 | 97.7 | 96.6 | 46 | |
| 8-44 | 45 | 110.0 | 109.1 | 108.2 | 107.2 | 106.3 | 105.3 | 104.3 | 103.3 | 102.3 | 101.2 | 100.1 | 99.0 | 97.8 | 96.6 | 95.4 | 45 | 3-16 |
| | 44 | 109.2 | 108.3 | 107.4 | 106.4 | 105.4 | 104.4 | 103.4 | 102.3 | 101.3 | 100.2 | 99.1 | 97.9 | 96.7 | 95.5 | 94.3 | 44 | |
| | 43 | 108.4 | 107.5 | 106.5 | 105.5 | 104.5 | 103.5 | 102.5 | 101.4 | 100.3 | 99.2 | 98.0 | 96.9 | 95.7 | 94.4 | 93.2 | 43 | |
| | 42 | 107.6 | 106.7 | 105.7 | 104.7 | 103.7 | 102.6 | 101.5 | 100.4 | 99.3 | 98.2 | 97.0 | 95.8 | 94.6 | 93.3 | 92.1 | 42 | |
| | 41 | 106.8 | 105.8 | 104.8 | 103.8 | 102.7 | 101.7 | 100.6 | 99.4 | 98.3 | 97.1 | 95.9 | 94.7 | 93.5 | 92.2 | 90.9 | 41 | |
| | 49 | 112.0 | 111.2 | 110.4 | 109.6 | 108.7 | 107.8 | 106.9 | 106.0 | 105.1 | 104.1 | 103.2 | 102.2 | 101.2 | 100.1 | 99.0 | 49 | |
| | 48 | 111.3 | 110.5 | 109.6 | 108.8 | 107.9 | 107.0 | 106.1 | 105.2 | 104.2 | 103.2 | 102.2 | 101.2 | 100.1 | 99.1 | 97.9 | 48 | |
| | 47 | 110.6 | 109.7 | 108.9 | 108.0 | 107.1 | 106.2 | 105.2 | 104.3 | 103.3 | 102.3 | 101.2 | 100.2 | 99.1 | 98.0 | 96.9 | 47 | |
| | 46 | 109.8 | 109.0 | 108.1 | 107.2 | 106.3 | 105.3 | 104.3 | 103.4 | 102.3 | 101.3 | 100.2 | 99.2 | 98.1 | 96.9 | 95.8 | 46 | |
| 8-40 | 45 | 109.1 | 108.2 | 107.3 | 106.4 | 105.4 | 104.4 | 103.5 | 102.4 | 101.4 | 100.3 | 99.3 | 98.2 | 97.0 | 95.9 | 94.7 | 45 | 3-20 |
| | 44 | 108.3 | 107.4 | 106.5 | 105.5 | 104.6 | 103.6 | 102.5 | 101.5 | 100.5 | 99.4 | 98.3 | 97.1 | 96.0 | 94.8 | 93.6 | 44 | |
| | 43 | 107.6 | 106.6 | 105.7 | 104.7 | 103.7 | 102.7 | 101.6 | 100.6 | 99.5 | 98.4 | 97.2 | 96.1 | 94.9 | 93.7 | 92.5 | 43 | |
| | 42 | 106.8 | 105.8 | 104.8 | 103.8 | 102.8 | 101.8 | 100.7 | 99.6 | 98.5 | 97.4 | 96.2 | 95.1 | 93.9 | 92.6 | 91.4 | 42 | |
| | 41 | 106.0 | 105.0 | 104.0 | 103.0 | 101.9 | 100.9 | 99.8 | 98.7 | 97.5 | 96.4 | 95.2 | 94.0 | 92.8 | 91.5 | 90.3 | 41 | |
| | 49 | 111.1 | 110.3 | 109.5 | 108.6 | 107.8 | 106.9 | 106.0 | 105.1 | 104.2 | 103.2 | 102.3 | 101.3 | 100.3 | 99.2 | 98.1 | 49 | |
| | 48 | 110.4 | 109.6 | 108.7 | 107.9 | 107.0 | 106.1 | 105.2 | 104.3 | 103.3 | 102.3 | 101.3 | 100.3 | 99.3 | 98.2 | 97.1 | 48 | |
| | 47 | 109.7 | 108.8 | 107.9 | 107.1 | 106.2 | 105.3 | 104.3 | 103.4 | 102.4 | 101.4 | 100.4 | 99.3 | 98.3 | 97.2 | 96.0 | 47 | |
| | 46 | 108.9 | 108.1 | 107.2 | 106.3 | 105.4 | 104.4 | 103.5 | 102.5 | 101.5 | 100.5 | 99.4 | 98.3 | 97.2 | 96.1 | 95.0 | 46 | |
| 8-36 | 45 | 108.2 | 107.3 | 106.4 | 105.5 | 104.5 | 103.6 | 102.6 | 101.6 | 100.6 | 99.5 | 98.4 | 97.3 | 96.2 | 95.1 | 93.9 | 45 | 3-24 |
| | 44 | 107.5 | 106.6 | 105.6 | 104.7 | 103.7 | 102.7 | 101.7 | 100.7 | 99.6 | 98.6 | 97.5 | 96.3 | 95.2 | 94.0 | 92.8 | 44 | |
| | 43 | 106.7 | 105.8 | 104.8 | 103.9 | 102.9 | 101.8 | 100.8 | 99.8 | 98.7 | 97.6 | 96.5 | 95.3 | 94.2 | 93.0 | 91.8 | 43 | |
| | 42 | 106.0 | 105.0 | 104.0 | 103.0 | 102.0 | 101.0 | 99.9 | 98.8 | 97.7 | 96.6 | 95.5 | 94.3 | 93.1 | 91.9 | 90.7 | 42 | |
| | 41 | 105.2 | 104.2 | 103.2 | 102.2 | 101.1 | 100.1 | 99.0 | 97.9 | 96.8 | 95.6 | 94.5 | 93.3 | 92.1 | 90.9 | 89.6 | 41 | |
| | 49 | 110.1 | 109.3 | 108.5 | 107.7 | 106.9 | 106.0 | 105.1 | 104.2 | 103.3 | 102.4 | 101.4 | 100.4 | 99.4 | 98.4 | 97.3 | 49 | |
| | 48 | 109.5 | 108.6 | 107.8 | 107.0 | 106.1 | 105.2 | 104.3 | 103.4 | 102.4 | 101.5 | 100.5 | 99.5 | 98.4 | 97.4 | 96.3 | 48 | |
| | 47 | 108.8 | 107.9 | 107.1 | 106.2 | 105.3 | 104.4 | 103.5 | 102.5 | 101.5 | 100.5 | 99.5 | 98.5 | 97.4 | 96.3 | 95.2 | 47 | |
| | 46 | 108.1 | 107.2 | 106.3 | 105.4 | 104.5 | 103.6 | 102.6 | 101.6 | 100.6 | 99.6 | 98.6 | 97.5 | 96.4 | 95.3 | 94.2 | 46 | |
| 8-32 | 45 | 107.3 | 106.4 | 105.5 | 104.6 | 103.7 | 102.7 | 101.8 | 100.8 | 99.7 | 98.7 | 97.6 | 96.5 | 95.4 | 94.3 | 93.2 | 45 | 3-28 |
| | 44 | 106.6 | 105.7 | 104.8 | 103.8 | 102.9 | 101.9 | 100.9 | 99.9 | 98.8 | 97.8 | 96.7 | 95.6 | 94.4 | 93.3 | 92.1 | 44 | |
| | 43 | 105.9 | 104.9 | 104.0 | 103.0 | 102.0 | 101.0 | 100.0 | 99.0 | 97.9 | 96.8 | 95.7 | 94.6 | 93.4 | 92.3 | 91.1 | 43 | |
| | 42 | 105.1 | 104.2 | 103.2 | 102.2 | 101.2 | 100.2 | 99.1 | 98.1 | 97.0 | 95.9 | 94.7 | 93.6 | 92.4 | 91.2 | 90.0 | 42 | |
| | 41 | 104.4 | 103.4 | 102.4 | 101.4 | 100.4 | 99.3 | 98.3 | 97.2 | 96.1 | 94.9 | 93.8 | 92.6 | 91.4 | 90.2 | 89.0 | 41 | |
| | 49 | 109.2 | 108.4 | 107.6 | 106.8 | 106.0 | 105.1 | 104.2 | 103.3 | 102.4 | 101.5 | 100.5 | 99.5 | 98.5 | 97.5 | 96.5 | 49 | |
| | 48 | 108.6 | 107.7 | 106.9 | 106.1 | 105.2 | 104.3 | 103.4 | 102.5 | 101.5 | 100.6 | 99.6 | 98.6 | 97.6 | 96.5 | 95.5 | 48 | |
| | 47 | 107.9 | 107.0 | 106.2 | 105.3 | 104.4 | 103.5 | 102.6 | 101.6 | 100.7 | 99.7 | 98.7 | 97.7 | 96.6 | 95.5 | 94.4 | 47 | |
| | 46 | 107.2 | 106.3 | 105.4 | 104.5 | 103.6 | 102.7 | 101.8 | 100.8 | 99.8 | 98.8 | 97.8 | 96.7 | 95.6 | 94.5 | 93.4 | 46 | |
| 8-28 | 45 | 106.5 | 105.6 | 104.7 | 103.8 | 102.9 | 101.9 | 100.9 | 99.9 | 98.9 | 97.9 | 96.8 | 95.8 | 94.7 | 93.6 | 92.4 | 45 | 3-32 |
| | 44 | 105.8 | 104.8 | 103.9 | 103.0 | 102.1 | 101.1 | 100.1 | 99.1 | 98.0 | 97.0 | 95.9 | 94.8 | 93.7 | 92.6 | 91.4 | 44 | |
| | 43 | 105.0 | 104.1 | 103.2 | 102.2 | 101.2 | 100.2 | 99.2 | 98.2 | 97.1 | 96.1 | 95.0 | 93.8 | 92.7 | 91.5 | 90.4 | 43 | |
| | 42 | 104.3 | 103.4 | 102.4 | 101.4 | 100.4 | 99.4 | 98.4 | 97.3 | 96.2 | 95.1 | 94.0 | 92.9 | 91.7 | 90.5 | 89.3 | 42 | |
| | 41 | 103.6 | 102.6 | 101.6 | 100.6 | 99.6 | 98.6 | 97.5 | 96.4 | 95.3 | 94.2 | 93.1 | 91.9 | 90.7 | 89.5 | 88.3 | 41 | |
| | 49 | 108.3 | 107.5 | 106.7 | 105.9 | 105.1 | 104.2 | 103.3 | 102.5 | 101.5 | 100.6 | 99.7 | 98.7 | 97.7 | 96.7 | 95.6 | 49 | |
| | 48 | 107.7 | 106.9 | 106.0 | 105.2 | 104.3 | 103.4 | 102.5 | 101.6 | 100.7 | 99.7 | 98.8 | 97.8 | 96.8 | 95.7 | 94.7 | 48 | |
| | 47 | 107.0 | 106.2 | 105.3 | 104.4 | 103.6 | 102.7 | 101.7 | 100.8 | 99.9 | 98.9 | 97.9 | 96.9 | 95.8 | 94.8 | 93.7 | 47 | |
| | 46 | 106.3 | 105.5 | 104.6 | 103.7 | 102.8 | 101.9 | 100.9 | 100.0 | 99.0 | 98.0 | 97.0 | 95.9 | 94.9 | 93.8 | 92.7 | 46 | |
| 8-24 | 45 | 105.6 | 104.7 | 103.9 | 102.9 | 102.0 | 101.1 | 100.1 | 99.1 | 98.1 | 97.1 | 96.1 | 95.0 | 93.9 | 92.8 | 91.7 | 45 | 3-36 |
| | 44 | 104.9 | 104.0 | 103.1 | 102.2 | 101.2 | 100.3 | 99.3 | 98.3 | 97.3 | 96.2 | 95.1 | 94.1 | 93.0 | 91.8 | 90.7 | 44 | |
| | 43 | 104.2 | 103.3 | 102.4 | 101.4 | 100.4 | 99.5 | 98.5 | 97.4 | 96.4 | 95.3 | 94.2 | 93.1 | 92.0 | 90.8 | 89.7 | 43 | |
| | 42 | 103.5 | 102.6 | 101.6 | 100.6 | 99.6 | 98.6 | 97.6 | 96.6 | 95.5 | 94.4 | 93.3 | 92.2 | 91.0 | 89.9 | 88.7 | 42 | |
| | 41 | 102.8 | 101.8 | 100.8 | 99.8 | 98.8 | 97.8 | 96.8 | 95.7 | 94.6 | 93.5 | 92.4 | 91.2 | 90.1 | 88.9 | 87.7 | 41 | |
| | 49 | 107.4 | 106.6 | 105.8 | 105.0 | 104.2 | 103.3 | 102.5 | 101.6 | 100.7 | 99.8 | 98.8 | 97.8 | 96.9 | 95.9 | 94.8 | 49 | |
| | 48 | 106.8 | 106.0 | 105.2 | 104.3 | 103.5 | 102.6 | 101.7 | 100.8 | 99.9 | 98.9 | 97.9 | 97.0 | 95.9 | 94.9 | 93.9 | 48 | |
| | 47 | 106.1 | 105.3 | 104.5 | 103.6 | 102.7 | 101.8 | 100.9 | 100.0 | 99.0 | 98.0 | 97.1 | 96.0 | 95.0 | 94.0 | 92.9 | 47 | |
| | 46 | 105.5 | 104.6 | 103.7 | 102.9 | 102.0 | 101.0 | 100.1 | 99.2 | 98.2 | 97.2 | 96.2 | 95.1 | 94.1 | 93.0 | 91.9 | 46 | |
| 8-20 | 45 | 104.8 | 103.9 | 103.0 | 102.1 | 101.2 | 100.3 | 99.3 | 98.3 | 97.3 | 96.3 | 95.3 | 94.2 | 93.2 | 92.1 | 91.0 | 45 | 3-40 |
| | 44 | 104.1 | 103.2 | 102.3 | 101.4 | 100.4 | 99.5 | 98.5 | 97.5 | 96.5 | 95.5 | 94.4 | 93.3 | 92.2 | 91.1 | 90.0 | 44 | |
| | 43 | 103.4 | 102.5 | 101.6 | 100.6 | 99.7 | 98.7 | 97.7 | 96.7 | 95.6 | 94.6 | 93.5 | 92.4 | 91.3 | 90.2 | 89.0 | 43 | |
| | 42 | 102.7 | 101.8 | 100.8 | 99.9 | 98.9 | 97.9 | 96.9 | 95.8 | 94.8 | 93.7 | 92.6 | 91.5 | 90.4 | 89.2 | 88.0 | 42 | |
| | 41 | 102.0 | 101.1 | 100.1 | 99.1 | 98.1 | 97.1 | 96.0 | 95.0 | 93.9 | 92.8 | 91.7 | 90.6 | 89.4 | 88.3 | 87.1 | 41 | |
| | 49 | 106.5 | 105.8 | 105.0 | 104.2 | 103.3 | 102.5 | 101.6 | 100.7 | 99.8 | 98.9 | 98.0 | 97.0 | 96.0 | 95.0 | 94.0 | 49 | |
| | 48 | 105.9 | 105.1 | 104.3 | 103.5 | 102.6 | 101.7 | 100.8 | 99.9 | 99.0 | 98.1 | 97.1 | 96.1 | 95.1 | 94.1 | 93.1 | 48 | |
| | 47 | 105.3 | 104.4 | 103.6 | 102.7 | 101.9 | 101.0 | 100.1 | 99.1 | 98.2 | 97.2 | 96.3 | 95.3 | 94.2 | 93.2 | 92.1 | 47 | |
| | 46 | 104.6 | 103.8 | 102.9 | 102.0 | 101.1 | 100.2 | 99.3 | 98.4 | 97.4 | 96.4 | 95.4 | 94.4 | 93.3 | 92.3 | 91.2 | 46 | |
| 8-16 | 45 | 104.0 | 103.1 | 102.2 | 101.3 | 100.4 | 99.5 | 98.5 | 97.5 | 96.6 | 95.6 | 94.5 | 93.5 | 92.4 | 91.3 | 90.2 | 45 | 3-44 |
| | 44 | 103.3 | 102.4 | 101.5 | 100.6 | 99.7 | 98.7 | 97.7 | 96.7 | 95.7 | 94.7 | 93.7 | 92.6 | 91.5 | 90.4 | 89.3 | 44 | |
| | 43 | 102.6 | 101.7 | 100.8 | 99.8 | 98.9 | 97.9 | 96.9 | 95.9 | 94.9 | 93.8 | 92.8 | 91.7 | 90.6 | 89.5 | 88.3 | 43 | |
| | 42 | 101.9 | 101.0 | 100.1 | 99.1 | 98.1 | 97.1 | 96.1 | 95.1 | 94.1 | 93.0 | 91.9 | 90.8 | 89.7 | 88.6 | 87.4 | 42 | |
| | 41 | 101.2 | 100.3 | 99.3 | 98.3 | 97.4 | 96.3 | 95.3 | 94.3 | 93.2 | 92.1 | 91.0 | 89.9 | 88.8 | 87.6 | 86.4 | 41 | |
| | 49 | 105.7 | 104.9 | 104.1 | 103.3 | 102.5 | 101.6 | 100.8 | 99.9 | 99.0 | 98.1 | 97.1 | 96.2 | 95.2 | 94.2 | 93.2 | 49 | |
| | 48 | 105.1 | 104.3 | 103.4 | 102.6 | 101.8 | 100.9 | 100.0 | 99.1 | 98.2 | 97.3 | 96.3 | 95.3 | 94.4 | 93.3 | 92.3 | 48 | |
| | 47 | 104.4 | 103.6 | 102.8 | 101.9 | 101.0 | 100.2 | 99.3 | 98.3 | 97.4 | 96.4 | 95.5 | 94.5 | 93.5 | 92.4 | 91.4 | 47 | |
| | 46 | 103.8 | 102.9 | 102.1 | 101.2 | 100.3 | 99.4 | 98.5 | 97.6 | 96.6 | 95.6 | 94.6 | 93.6 | 92.6 | 91.5 | 90.5 | 46 | |
| 8-12 | 45 | 103.1 | 102.3 | 101.4 | 100.5 | 99.6 | 98.7 | 97.7 | 96.8 | 95.8 | 94.8 | 93.8 | 92.7 | 91.7 | 90.6 | 89.5 | 45 | 3-48 |
| | 44 | 102.5 | 101.6 | 100.7 | 99.8 | 98.9 | 97.9 | 97.0 | 96.0 | 95.0 | 94.0 | 92.9 | 91.9 | 90.8 | 89.7 | 88.6 | 44 | |
| | 43 | 101.8 | 100.9 | 100.0 | 99.1 | 98.1 | 97.2 | 96.2 | 95.2 | 94.2 | 93.1 | 92.1 | 91.0 | 89.9 | 88.8 | 87.7 | 43 | |
| | 42 | 101.2 | 100.2 | 99.3 | 98.3 | 97.4 | 96.4 | 95.4 | 94.4 | 93.4 | 92.3 | 91.2 | 90.1 | 89.0 | 87.9 | 86.8 | 42 | |
| | 41 | 100.5 | 99.5 | 98.6 | 97.6 | 96.6 | 95.6 | 94.6 | 93.6 | 92.5 | 91.5 | 90.4 | 89.3 | 88.1 | 87.0 | 85.8 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 116.1 | 115.5 | 114.8 | 114.2 | 113.5 | 112.9 | 112.2 | 111.5 | 110.8 | 110.1 | 109.4 | 108.7 | 108.0 | 107.2 | 106.4 | 49 | |
| | 48 | 115.8 | 115.1 | 114.5 | 113.8 | 113.1 | 112.4 | 111.7 | 111.0 | 110.3 | 109.6 | 108.9 | 108.1 | 107.4 | 106.6 | 105.8 | 48 | |
| | 47 | 115.4 | 114.8 | 114.1 | 113.4 | 112.7 | 112.0 | 111.3 | 110.6 | 109.8 | 109.1 | 108.4 | 107.6 | 106.8 | 106.0 | 105.2 | 47 | |
| | 46 | 115.0 | 114.4 | 113.7 | 113.0 | 112.2 | 111.5 | 110.8 | 110.1 | 109.3 | 108.6 | 107.8 | 107.0 | 106.2 | 105.4 | 104.6 | 46 | |
| 8-12 | 45 | 114.7 | 114.0 | 113.3 | 112.6 | 111.8 | 111.1 | 110.4 | 109.6 | 108.8 | 108.0 | 107.3 | 106.5 | 105.6 | 104.8 | 104.0 | 45 | 3-48 |
| | 44 | 114.3 | 113.6 | 112.8 | 112.1 | 111.4 | 110.6 | 109.9 | 109.1 | 108.3 | 107.5 | 106.7 | 105.9 | 105.1 | 104.2 | 103.4 | 44 | |
| | 43 | 113.9 | 113.2 | 112.4 | 111.7 | 110.9 | 110.1 | 109.4 | 108.6 | 107.8 | 107.0 | 106.1 | 105.3 | 104.4 | 103.6 | 102.7 | 43 | |
| | 42 | 113.5 | 112.7 | 112.0 | 111.2 | 110.4 | 109.7 | 108.9 | 108.1 | 107.2 | 106.4 | 105.6 | 104.7 | 103.8 | 103.0 | 102.1 | 42 | |
| | 41 | 113.1 | 112.3 | 111.5 | 110.8 | 110.0 | 109.2 | 108.3 | 107.5 | 106.7 | 105.8 | 105.0 | 104.1 | 103.2 | 102.3 | 101.4 | 41 | |
| | 49 | 115.2 | 114.6 | 114.0 | 113.3 | 112.7 | 112.0 | 111.3 | 110.7 | 110.0 | 109.3 | 108.5 | 107.8 | 107.1 | 106.3 | 105.6 | 49 | |
| | 48 | 114.9 | 114.3 | 113.6 | 112.9 | 112.3 | 111.6 | 110.9 | 110.2 | 109.5 | 108.7 | 108.0 | 107.3 | 106.5 | 105.8 | 105.0 | 48 | |
| | 47 | 114.6 | 113.9 | 113.2 | 112.5 | 111.9 | 111.2 | 110.4 | 109.7 | 109.0 | 108.3 | 107.5 | 106.7 | 106.0 | 105.2 | 104.4 | 47 | |
| | 46 | 114.2 | 113.5 | 112.8 | 112.1 | 111.4 | 110.7 | 110.0 | 109.2 | 108.5 | 107.7 | 107.0 | 106.2 | 105.4 | 104.6 | 103.8 | 46 | |
| 8-08 | 45 | 113.8 | 113.1 | 112.4 | 111.7 | 111.0 | 110.3 | 109.5 | 108.8 | 108.0 | 107.2 | 106.4 | 105.6 | 104.8 | 104.0 | 103.2 | 45 | 3-52 |
| | 44 | 113.5 | 112.8 | 112.0 | 111.3 | 110.6 | 109.8 | 109.0 | 108.3 | 107.5 | 106.7 | 105.9 | 105.1 | 104.2 | 103.4 | 102.6 | 44 | |
| | 43 | 113.1 | 112.3 | 111.6 | 110.9 | 110.1 | 109.3 | 108.6 | 107.8 | 107.0 | 106.2 | 105.3 | 104.5 | 103.7 | 102.8 | 101.9 | 43 | |
| | 42 | 112.7 | 111.9 | 111.2 | 110.4 | 109.6 | 108.9 | 108.1 | 107.3 | 106.4 | 105.6 | 104.8 | 103.9 | 103.1 | 102.2 | 101.3 | 42 | |
| | 41 | 112.3 | 111.5 | 110.8 | 110.0 | 109.2 | 108.4 | 107.6 | 106.7 | 105.9 | 105.1 | 104.2 | 103.3 | 102.4 | 101.6 | 100.6 | 41 | |
| | 49 | 114.4 | 113.8 | 113.1 | 112.5 | 111.8 | 111.1 | 110.5 | 109.8 | 109.1 | 108.4 | 107.7 | 107.0 | 106.2 | 105.5 | 104.7 | 49 | |
| | 48 | 114.1 | 113.4 | 112.8 | 112.1 | 111.4 | 110.7 | 110.0 | 109.3 | 108.6 | 107.9 | 107.2 | 106.4 | 105.7 | 104.9 | 104.1 | 48 | |
| | 47 | 113.7 | 113.1 | 112.4 | 111.7 | 111.0 | 110.3 | 109.6 | 108.9 | 108.1 | 107.4 | 106.7 | 105.9 | 105.1 | 104.4 | 103.6 | 47 | |
| | 46 | 113.4 | 112.7 | 112.0 | 111.3 | 110.6 | 109.9 | 109.1 | 108.4 | 107.7 | 106.9 | 106.1 | 105.4 | 104.6 | 103.8 | 103.0 | 46 | |
| 8-04 | 45 | 113.0 | 112.3 | 111.6 | 110.9 | 110.2 | 109.5 | 108.7 | 107.9 | 107.2 | 106.4 | 105.6 | 104.8 | 104.0 | 103.2 | 102.4 | 45 | 3-56 |
| | 44 | 112.7 | 111.9 | 111.2 | 110.5 | 109.7 | 109.0 | 108.2 | 107.5 | 106.7 | 105.9 | 105.1 | 104.3 | 103.4 | 102.6 | 101.8 | 44 | |
| | 43 | 112.3 | 111.5 | 110.8 | 110.1 | 109.3 | 108.5 | 107.8 | 107.0 | 106.2 | 105.4 | 104.5 | 103.7 | 102.9 | 102.0 | 101.2 | 43 | |
| | 42 | 111.9 | 111.2 | 110.4 | 109.6 | 108.9 | 108.1 | 107.3 | 106.5 | 105.7 | 104.8 | 104.0 | 103.2 | 102.3 | 101.4 | 100.5 | 42 | |
| | 41 | 111.5 | 110.8 | 110.0 | 109.2 | 108.4 | 107.6 | 106.8 | 106.0 | 105.1 | 104.3 | 103.4 | 102.6 | 101.7 | 100.8 | 99.9 | 41 | |
| | 49 | 113.6 | 112.9 | 112.3 | 111.6 | 111.0 | 110.3 | 109.6 | 108.9 | 108.2 | 107.5 | 106.8 | 106.1 | 105.4 | 104.6 | 103.9 | 49 | |
| | 48 | 113.2 | 112.6 | 111.9 | 111.2 | 110.6 | 109.9 | 109.2 | 108.5 | 107.8 | 107.1 | 106.3 | 105.6 | 104.8 | 104.1 | 103.3 | 48 | |
| | 47 | 112.9 | 112.2 | 111.5 | 110.9 | 110.2 | 109.5 | 108.8 | 108.0 | 107.3 | 106.6 | 105.8 | 105.1 | 104.3 | 103.5 | 102.7 | 47 | |
| | 46 | 112.5 | 111.9 | 111.2 | 110.5 | 109.8 | 109.0 | 108.3 | 107.6 | 106.8 | 106.1 | 105.3 | 104.5 | 103.8 | 103.0 | 102.2 | 46 | |
| 8-00 | 45 | 112.2 | 111.5 | 110.8 | 110.1 | 109.4 | 108.6 | 107.9 | 107.1 | 106.4 | 105.6 | 104.8 | 104.0 | 103.2 | 102.4 | 101.6 | 45 | 4-00 |
| | 44 | 111.9 | 111.1 | 110.4 | 109.7 | 108.9 | 108.2 | 107.4 | 106.7 | 105.9 | 105.1 | 104.3 | 103.5 | 102.7 | 101.8 | 101.0 | 44 | |
| | 43 | 111.5 | 110.8 | 110.0 | 109.3 | 108.5 | 107.7 | 107.0 | 106.2 | 105.4 | 104.6 | 103.8 | 102.9 | 102.1 | 101.3 | 100.4 | 43 | |
| | 42 | 111.1 | 110.4 | 109.6 | 108.9 | 108.1 | 107.3 | 106.5 | 105.7 | 104.9 | 104.1 | 103.2 | 102.4 | 101.5 | 100.7 | 99.8 | 42 | |
| | 41 | 110.7 | 110.0 | 109.2 | 108.4 | 107.6 | 106.8 | 106.0 | 105.2 | 104.4 | 103.5 | 102.7 | 101.8 | 101.0 | 100.1 | 99.2 | 41 | |
| | 49 | 112.7 | 112.1 | 111.4 | 110.8 | 110.1 | 109.4 | 108.8 | 108.1 | 107.4 | 106.7 | 106.0 | 105.3 | 104.5 | 103.8 | 103.0 | 49 | |
| | 48 | 112.4 | 111.7 | 111.1 | 110.4 | 109.7 | 109.0 | 108.4 | 107.7 | 106.9 | 106.2 | 105.5 | 104.8 | 104.0 | 103.2 | 102.5 | 48 | |
| | 47 | 112.1 | 111.4 | 110.7 | 110.0 | 109.3 | 108.6 | 107.9 | 107.2 | 106.5 | 105.8 | 105.0 | 104.3 | 103.5 | 102.7 | 101.9 | 47 | |
| | 46 | 111.7 | 111.1 | 110.4 | 109.7 | 108.9 | 108.2 | 107.5 | 106.8 | 106.0 | 105.3 | 104.5 | 103.7 | 103.0 | 102.2 | 101.4 | 46 | |
| 7-56 | 45 | 111.4 | 110.7 | 110.0 | 109.3 | 108.6 | 107.8 | 107.1 | 106.3 | 105.6 | 104.8 | 104.0 | 103.2 | 102.4 | 101.6 | 100.8 | 45 | 4-04 |
| | 44 | 111.1 | 110.3 | 109.6 | 108.9 | 108.1 | 107.4 | 106.6 | 105.9 | 105.1 | 104.3 | 103.5 | 102.7 | 101.9 | 101.0 | 100.2 | 44 | |
| | 43 | 110.7 | 110.0 | 109.2 | 108.5 | 107.7 | 107.0 | 106.2 | 105.4 | 104.6 | 103.8 | 103.0 | 102.2 | 101.3 | 100.5 | 99.6 | 43 | |
| | 42 | 110.4 | 109.6 | 108.9 | 108.1 | 107.3 | 106.5 | 105.7 | 104.9 | 104.1 | 103.3 | 102.5 | 101.6 | 100.8 | 99.9 | 99.0 | 42 | |
| | 41 | 110.0 | 109.2 | 108.5 | 107.7 | 106.9 | 106.1 | 105.3 | 104.5 | 103.6 | 102.8 | 101.9 | 101.1 | 100.2 | 99.3 | 98.5 | 41 | |
| | 49 | 111.9 | 111.2 | 110.6 | 109.9 | 109.3 | 108.6 | 107.9 | 107.2 | 106.5 | 105.8 | 105.1 | 104.4 | 103.7 | 102.9 | 102.2 | 49 | |
| | 48 | 111.6 | 110.9 | 110.2 | 109.6 | 108.9 | 108.2 | 107.5 | 106.8 | 106.1 | 105.4 | 104.7 | 103.9 | 103.2 | 102.4 | 101.7 | 48 | |
| | 47 | 111.3 | 110.6 | 109.9 | 109.2 | 108.5 | 107.8 | 107.1 | 106.4 | 105.7 | 104.9 | 104.2 | 103.4 | 102.7 | 101.9 | 101.1 | 47 | |
| | 46 | 110.9 | 110.2 | 109.6 | 108.9 | 108.1 | 107.4 | 106.7 | 106.0 | 105.2 | 104.5 | 103.7 | 102.9 | 102.2 | 101.4 | 100.6 | 46 | |
| 7-52 | 45 | 110.6 | 109.9 | 109.2 | 108.5 | 107.8 | 107.0 | 106.3 | 105.5 | 104.8 | 104.0 | 103.2 | 102.4 | 101.6 | 100.8 | 100.0 | 45 | 4-08 |
| | 44 | 110.3 | 109.6 | 108.8 | 108.1 | 107.4 | 106.6 | 105.8 | 105.1 | 104.3 | 103.5 | 102.7 | 101.9 | 101.1 | 100.3 | 99.4 | 44 | |
| | 43 | 109.9 | 109.2 | 108.5 | 107.7 | 107.0 | 106.2 | 105.4 | 104.6 | 103.8 | 103.0 | 102.2 | 101.4 | 100.6 | 99.7 | 98.9 | 43 | |
| | 42 | 109.6 | 108.8 | 108.1 | 107.3 | 106.5 | 105.8 | 105.0 | 104.2 | 103.4 | 102.6 | 101.7 | 100.9 | 100.0 | 99.2 | 98.3 | 42 | |
| | 41 | 109.2 | 108.5 | 107.7 | 106.9 | 106.1 | 105.3 | 104.5 | 103.7 | 102.9 | 102.1 | 101.2 | 100.4 | 99.5 | 98.6 | 97.7 | 41 | |
| | 49 | 110.0 | 110.4 | 109.7 | 109.1 | 108.4 | 107.8 | 107.1 | 106.4 | 105.7 | 105.0 | 104.3 | 103.6 | 102.9 | 102.1 | 101.4 | 49 | |
| | 48 | 110.8 | 110.1 | 109.4 | 108.8 | 108.1 | 107.4 | 106.7 | 106.0 | 105.3 | 104.6 | 103.8 | 103.1 | 102.4 | 101.6 | 100.8 | 48 | |
| | 47 | 110.4 | 109.8 | 109.1 | 108.4 | 107.7 | 107.0 | 106.3 | 105.6 | 104.9 | 104.1 | 103.4 | 102.6 | 101.9 | 101.1 | 100.3 | 47 | |
| | 46 | 110.0 | 109.4 | 108.8 | 108.1 | 107.3 | 106.6 | 105.9 | 105.2 | 104.4 | 103.7 | 102.9 | 102.1 | 101.4 | 100.6 | 99.8 | 46 | |
| 7-48 | 45 | 109.8 | 109.1 | 108.4 | 107.7 | 107.0 | 106.2 | 105.5 | 104.7 | 104.0 | 103.2 | 102.4 | 101.7 | 100.9 | 100.1 | 99.2 | 45 | 4-12 |
| | 44 | 109.5 | 108.8 | 108.1 | 107.3 | 106.6 | 105.8 | 105.1 | 104.3 | 103.5 | 102.7 | 102.0 | 101.1 | 100.3 | 99.5 | 98.7 | 44 | |
| | 43 | 109.2 | 108.4 | 107.7 | 106.9 | 106.2 | 105.4 | 104.6 | 103.9 | 103.1 | 102.3 | 101.5 | 100.7 | 99.8 | 99.0 | 98.1 | 43 | |
| | 42 | 108.8 | 108.1 | 107.3 | 106.6 | 105.8 | 105.0 | 104.2 | 103.4 | 102.6 | 101.8 | 101.0 | 100.1 | 99.3 | 98.4 | 97.6 | 42 | |
| | 41 | 108.5 | 107.7 | 107.0 | 106.2 | 105.4 | 104.6 | 103.8 | 103.0 | 102.2 | 101.3 | 100.5 | 99.6 | 98.8 | 97.9 | 97.0 | 41 | |
| | 49 | 110.2 | 109.6 | 108.9 | 108.3 | 107.6 | 106.9 | 106.2 | 105.6 | 104.9 | 104.2 | 103.5 | 102.8 | 102.0 | 101.3 | 100.6 | 49 | |
| | 48 | 109.9 | 109.3 | 108.6 | 107.9 | 107.3 | 106.6 | 105.9 | 105.2 | 104.5 | 103.7 | 103.0 | 102.3 | 101.5 | 100.8 | 100.0 | 48 | |
| | 47 | 109.6 | 109.0 | 108.3 | 107.6 | 106.9 | 106.2 | 105.5 | 104.8 | 104.1 | 103.3 | 102.6 | 101.8 | 101.1 | 100.3 | 99.5 | 47 | |
| | 46 | 109.3 | 108.6 | 108.0 | 107.3 | 106.5 | 105.8 | 105.1 | 104.4 | 103.6 | 102.9 | 102.1 | 101.4 | 100.6 | 99.8 | 99.0 | 46 | |
| 7-44 | 45 | 109.0 | 108.3 | 107.6 | 106.9 | 106.2 | 105.4 | 104.7 | 104.0 | 103.2 | 102.4 | 101.7 | 100.9 | 100.1 | 99.3 | 98.5 | 45 | 4-16 |
| | 44 | 108.7 | 108.0 | 107.3 | 106.6 | 105.8 | 105.1 | 104.3 | 103.5 | 102.8 | 102.0 | 101.2 | 100.4 | 99.6 | 98.8 | 97.9 | 44 | |
| | 43 | 108.4 | 107.7 | 106.9 | 106.2 | 105.4 | 104.7 | 103.9 | 103.1 | 102.3 | 101.5 | 100.7 | 99.9 | 99.1 | 98.3 | 97.4 | 43 | |
| | 42 | 108.1 | 107.3 | 106.6 | 105.8 | 105.0 | 104.3 | 103.5 | 102.7 | 101.9 | 101.1 | 100.2 | 99.4 | 98.6 | 97.7 | 96.9 | 42 | |
| | 41 | 107.8 | 107.0 | 106.2 | 105.4 | 104.7 | 103.9 | 103.1 | 102.2 | 101.4 | 100.6 | 99.8 | 98.9 | 98.1 | 97.2 | 96.3 | 41 | |
| | 49 | 109.4 | 108.7 | 108.1 | 107.4 | 106.8 | 106.1 | 105.4 | 104.7 | 104.1 | 103.4 | 102.7 | 101.9 | 101.2 | 100.5 | 99.7 | 49 | |
| | 48 | 109.1 | 108.5 | 107.8 | 107.1 | 106.4 | 105.8 | 105.1 | 104.4 | 103.7 | 102.9 | 102.2 | 101.5 | 100.7 | 100.0 | 99.2 | 48 | |
| | 47 | 108.8 | 108.2 | 107.5 | 106.8 | 106.1 | 105.4 | 104.7 | 104.0 | 103.2 | 102.5 | 101.8 | 101.0 | 100.3 | 99.5 | 98.7 | 47 | |
| | 46 | 108.6 | 107.9 | 107.2 | 106.5 | 105.7 | 105.0 | 104.3 | 103.6 | 102.8 | 102.1 | 101.3 | 100.6 | 99.8 | 99.0 | 98.2 | 46 | |
| 7-40 | 45 | 108.3 | 107.5 | 106.8 | 106.1 | 105.4 | 104.7 | 103.9 | 103.2 | 102.4 | 101.7 | 100.9 | 100.1 | 99.3 | 98.5 | 97.7 | 45 | 4-20 |
| | 44 | 108.0 | 107.2 | 106.5 | 105.8 | 105.0 | 104.3 | 103.5 | 102.8 | 102.0 | 101.2 | 100.4 | 99.6 | 98.8 | 98.0 | 97.2 | 44 | |
| | 43 | 107.7 | 106.9 | 106.2 | 105.4 | 104.7 | 103.9 | 103.1 | 102.4 | 101.6 | 100.8 | 100.0 | 99.2 | 98.3 | 97.5 | 96.7 | 43 | |
| | 42 | 107.3 | 106.6 | 105.8 | 105.1 | 104.3 | 103.5 | 102.7 | 101.9 | 101.1 | 100.3 | 99.5 | 98.7 | 97.9 | 97.0 | 96.1 | 42 | |
| | 41 | 107.0 | 106.3 | 105.5 | 104.5 | 103.9 | 103.1 | 102.3 | 101.5 | 100.7 | 99.9 | 99.0 | 98.2 | 97.4 | 96.5 | 95.6 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 105.7 | 104.9 | 104.1 | 103.3 | 102.5 | 101.6 | 100.8 | 99.9 | 99.0 | 98.1 | 97.1 | 96.2 | 95.2 | 94.2 | 93.2 | 49 | |
| | 48 | 105.1 | 104.3 | 103.4 | 102.6 | 101.8 | 100.9 | 100.0 | 99.1 | 98.2 | 97.3 | 96.3 | 95.3 | 94.4 | 93.3 | 92.3 | 48 | |
| | 47 | 104.4 | 103.6 | 102.8 | 101.9 | 101.0 | 100.2 | 99.3 | 98.3 | 97.4 | 96.4 | 95.5 | 94.5 | 93.5 | 92.4 | 91.4 | 47 | |
| | 46 | 103.8 | 102.9 | 102.1 | 101.2 | 100.3 | 99.4 | 98.5 | 97.6 | 96.6 | 95.6 | 94.6 | 93.6 | 92.6 | 91.5 | 90.5 | 46 | |
| 8-12 | 45 | 103.1 | 102.3 | 101.4 | 100.5 | 99.6 | 98.7 | 97.7 | 96.8 | 95.8 | 94.8 | 93.8 | 92.7 | 91.7 | 90.6 | 89.5 | 45 | 3-48 |
| | 44 | 102.5 | 101.6 | 100.7 | 99.8 | 98.9 | 97.9 | 97.0 | 96.0 | 95.0 | 94.0 | 92.9 | 91.9 | 90.8 | 89.7 | 88.6 | 44 | |
| | 43 | 101.8 | 100.9 | 100.0 | 99.1 | 98.1 | 97.2 | 96.2 | 95.2 | 94.2 | 93.1 | 92.1 | 91.0 | 89.9 | 88.8 | 87.7 | 43 | |
| | 42 | 101.2 | 100.2 | 99.3 | 98.3 | 97.4 | 96.4 | 95.4 | 94.4 | 93.4 | 92.3 | 91.2 | 90.1 | 89.0 | 87.9 | 86.8 | 42 | |
| | 41 | 100.5 | 99.5 | 98.6 | 97.6 | 96.6 | 95.6 | 94.6 | 93.6 | 92.5 | 91.5 | 90.4 | 89.3 | 88.1 | 87.0 | 85.8 | 41 | |
| | 49 | 104.8 | 104.0 | 103.2 | 102.4 | 101.6 | 100.8 | 99.9 | 99.1 | 98.2 | 97.2 | 96.3 | 95.4 | 94.4 | 93.4 | 92.4 | 49 | |
| | 48 | 104.2 | 103.4 | 102.6 | 101.8 | 100.9 | 100.1 | 99.2 | 98.3 | 97.4 | 96.5 | 95.5 | 94.5 | 93.6 | 92.6 | 91.5 | 48 | |
| | 47 | 103.6 | 102.8 | 101.9 | 101.1 | 100.2 | 99.3 | 98.4 | 97.5 | 96.6 | 95.7 | 94.7 | 93.7 | 92.7 | 91.7 | 90.6 | 47 | |
| | 46 | 103.0 | 102.1 | 101.3 | 100.4 | 99.5 | 98.6 | 97.7 | 96.8 | 95.8 | 94.8 | 93.9 | 92.9 | 91.8 | 90.8 | 89.7 | 46 | |
| 8-08 | 45 | 102.3 | 101.5 | 100.6 | 99.7 | 98.8 | 97.9 | 96.9 | 96.0 | 95.0 | 94.0 | 93.0 | 92.0 | 91.0 | 89.9 | 88.8 | 45 | 3-52 |
| | 44 | 101.7 | 100.8 | 99.9 | 99.0 | 98.1 | 97.2 | 96.2 | 95.2 | 94.2 | 93.2 | 92.2 | 91.2 | 90.1 | 89.0 | 87.9 | 44 | |
| | 43 | 101.0 | 100.1 | 99.2 | 98.3 | 97.4 | 96.4 | 95.5 | 94.5 | 93.5 | 92.4 | 91.4 | 90.3 | 89.2 | 88.1 | 87.0 | 43 | |
| | 42 | 100.4 | 99.5 | 98.5 | 97.6 | 96.6 | 95.7 | 94.7 | 93.7 | 92.7 | 91.6 | 90.5 | 89.5 | 88.4 | 87.3 | 86.1 | 42 | |
| | 41 | 99.7 | 98.8 | 97.9 | 96.9 | 95.9 | 94.9 | 93.9 | 92.9 | 91.8 | 90.8 | 89.7 | 88.6 | 87.5 | 86.4 | 85.2 | 41 | |
| | 49 | 104.0 | 103.2 | 102.4 | 101.6 | 100.8 | 99.9 | 99.1 | 98.2 | 97.3 | 96.4 | 95.5 | 94.6 | 93.6 | 92.7 | 91.7 | 49 | |
| | 48 | 103.4 | 102.6 | 101.7 | 100.9 | 100.1 | 99.2 | 98.4 | 97.5 | 96.6 | 95.7 | 94.7 | 93.8 | 92.8 | 91.8 | 90.8 | 48 | |
| | 47 | 102.8 | 101.9 | 101.1 | 100.3 | 99.4 | 98.5 | 97.6 | 96.7 | 95.8 | 94.9 | 93.9 | 92.9 | 92.0 | 90.9 | 89.9 | 47 | |
| | 46 | 102.1 | 101.3 | 100.5 | 99.6 | 98.7 | 97.8 | 96.9 | 96.0 | 95.1 | 94.1 | 93.1 | 92.1 | 91.1 | 90.1 | 89.0 | 46 | |
| 8-04 | 45 | 101.5 | 100.7 | 99.8 | 98.9 | 98.0 | 97.1 | 96.2 | 95.2 | 94.3 | 93.3 | 92.3 | 91.3 | 90.3 | 89.2 | 88.1 | 45 | 3-56 |
| | 44 | 100.9 | 100.0 | 99.1 | 98.2 | 97.3 | 96.4 | 95.4 | 94.5 | 93.5 | 92.5 | 91.5 | 90.5 | 89.4 | 88.3 | 87.3 | 44 | |
| | 43 | 100.3 | 99.4 | 98.5 | 97.6 | 96.6 | 95.7 | 94.7 | 93.7 | 92.7 | 91.7 | 90.7 | 89.6 | 88.6 | 87.5 | 86.4 | 43 | |
| | 42 | 99.6 | 98.7 | 97.8 | 96.9 | 95.9 | 94.9 | 94.0 | 93.0 | 92.0 | 90.9 | 89.9 | 88.8 | 87.7 | 86.6 | 85.5 | 42 | |
| | 41 | 99.0 | 98.1 | 97.1 | 96.2 | 95.2 | 94.2 | 93.2 | 92.2 | 91.2 | 90.1 | 89.1 | 88.0 | 86.9 | 85.8 | 84.6 | 41 | |
| | 49 | 103.1 | 102.3 | 101.5 | 100.7 | 99.9 | 99.1 | 98.2 | 97.4 | 96.5 | 95.6 | 94.7 | 93.8 | 92.8 | 91.9 | 90.9 | 49 | |
| | 48 | 102.5 | 101.7 | 100.9 | 100.1 | 99.3 | 98.4 | 97.6 | 96.7 | 95.8 | 94.9 | 93.9 | 93.0 | 92.0 | 91.1 | 90.1 | 48 | |
| | 47 | 101.9 | 101.1 | 100.3 | 99.5 | 98.6 | 97.7 | 96.8 | 95.9 | 95.0 | 94.1 | 93.1 | 92.2 | 91.2 | 90.2 | 89.2 | 47 | |
| | 46 | 101.3 | 100.5 | 99.7 | 98.8 | 97.9 | 97.0 | 96.1 | 95.2 | 94.3 | 93.3 | 92.4 | 91.4 | 90.4 | 89.4 | 88.3 | 46 | |
| 8-00 | 45 | 100.8 | 99.9 | 99.0 | 98.1 | 97.3 | 96.3 | 95.4 | 94.5 | 93.5 | 92.6 | 91.6 | 90.6 | 89.6 | 88.5 | 87.5 | 45 | 4-00 |
| | 44 | 100.1 | 99.3 | 98.4 | 97.5 | 96.6 | 95.6 | 94.7 | 93.7 | 92.8 | 91.8 | 90.8 | 89.8 | 88.7 | 87.7 | 86.6 | 44 | |
| | 43 | 99.5 | 98.6 | 97.7 | 96.8 | 95.9 | 94.9 | 94.0 | 93.0 | 92.0 | 91.0 | 90.0 | 89.0 | 87.9 | 86.8 | 85.7 | 43 | |
| | 42 | 98.9 | 98.0 | 97.1 | 96.1 | 95.2 | 94.2 | 93.3 | 92.3 | 91.3 | 90.2 | 89.2 | 88.2 | 87.1 | 86.0 | 84.9 | 42 | |
| | 41 | 98.3 | 97.4 | 96.4 | 95.5 | 94.5 | 93.5 | 92.5 | 91.5 | 90.5 | 89.5 | 88.4 | 87.4 | 86.3 | 85.2 | 84.0 | 41 | |
| | 49 | 102.3 | 101.5 | 100.7 | 99.9 | 99.1 | 98.3 | 97.4 | 96.6 | 95.7 | 94.8 | 93.9 | 93.0 | 92.1 | 91.1 | 90.1 | 49 | |
| | 48 | 101.7 | 100.9 | 100.1 | 99.3 | 98.5 | 97.6 | 96.8 | 95.9 | 95.0 | 94.1 | 93.2 | 92.2 | 91.3 | 90.3 | 89.3 | 48 | |
| | 47 | 101.1 | 100.3 | 99.5 | 98.7 | 97.8 | 96.9 | 96.1 | 95.2 | 94.3 | 93.3 | 92.4 | 91.4 | 90.5 | 89.5 | 88.5 | 47 | |
| | 46 | 100.5 | 99.7 | 98.9 | 98.0 | 97.2 | 96.3 | 95.4 | 94.5 | 93.5 | 92.6 | 91.6 | 90.7 | 89.7 | 88.7 | 87.6 | 46 | |
| 7-56 | 45 | 100.0 | 99.1 | 98.3 | 97.4 | 96.5 | 95.6 | 94.7 | 93.7 | 92.8 | 91.8 | 90.9 | 89.9 | 88.9 | 87.8 | 86.8 | 45 | 4-04 |
| | 44 | 99.4 | 98.5 | 97.6 | 96.7 | 95.8 | 94.9 | 94.0 | 93.0 | 92.1 | 91.1 | 90.1 | 89.1 | 88.1 | 87.0 | 85.9 | 44 | |
| | 43 | 98.8 | 97.9 | 97.0 | 96.1 | 95.2 | 94.2 | 93.3 | 92.3 | 91.3 | 90.3 | 89.3 | 88.3 | 87.3 | 86.2 | 85.1 | 43 | |
| | 42 | 98.2 | 97.3 | 96.4 | 95.4 | 94.5 | 93.5 | 92.6 | 91.6 | 90.6 | 89.6 | 88.6 | 87.5 | 86.5 | 85.4 | 84.3 | 42 | |
| | 41 | 97.6 | 96.6 | 95.7 | 94.8 | 93.8 | 92.8 | 91.9 | 90.9 | 89.9 | 88.8 | 87.8 | 86.7 | 85.7 | 84.6 | 83.5 | 41 | |
| | 49 | 101.5 | 100.7 | 99.9 | 99.1 | 98.3 | 97.5 | 96.6 | 95.8 | 94.9 | 94.0 | 93.1 | 92.2 | 91.3 | 90.4 | 89.4 | 49 | |
| | 48 | 100.9 | 100.1 | 99.3 | 98.5 | 97.7 | 96.8 | 96.0 | 95.1 | 94.2 | 93.3 | 92.4 | 91.5 | 90.5 | 89.6 | 88.6 | 48 | |
| | 47 | 100.3 | 99.5 | 98.7 | 97.9 | 97.0 | 96.2 | 95.3 | 94.4 | 93.5 | 92.6 | 91.6 | 90.7 | 89.7 | 88.8 | 87.8 | 47 | |
| | 46 | 99.8 | 98.9 | 98.1 | 97.2 | 96.4 | 95.5 | 94.6 | 93.7 | 92.8 | 91.8 | 90.9 | 89.9 | 88.9 | 87.9 | 86.9 | 46 | |
| 7-52 | 45 | 99.2 | 98.3 | 97.5 | 96.6 | 95.7 | 94.8 | 93.9 | 93.0 | 92.1 | 91.1 | 90.1 | 89.2 | 88.2 | 87.1 | 86.1 | 45 | 4-08 |
| | 44 | 98.6 | 97.7 | 96.9 | 96.0 | 95.1 | 94.2 | 93.2 | 92.3 | 91.4 | 90.4 | 89.4 | 88.4 | 87.4 | 86.3 | 85.3 | 44 | |
| | 43 | 98.0 | 97.1 | 96.3 | 95.3 | 94.4 | 93.5 | 92.6 | 91.6 | 90.6 | 89.6 | 88.7 | 87.6 | 86.6 | 85.6 | 84.5 | 43 | |
| | 42 | 97.4 | 96.5 | 95.6 | 94.7 | 93.8 | 92.8 | 91.9 | 90.9 | 89.9 | 88.9 | 87.9 | 86.9 | 85.8 | 84.8 | 83.7 | 42 | |
| | 41 | 96.8 | 95.9 | 95.0 | 94.1 | 93.1 | 92.2 | 91.2 | 90.2 | 89.2 | 88.2 | 87.2 | 86.1 | 85.0 | 84.0 | 82.9 | 41 | |
| | 49 | 100.6 | 99.8 | 99.1 | 98.3 | 97.5 | 96.7 | 95.8 | 95.0 | 94.1 | 93.2 | 92.4 | 91.5 | 90.5 | 89.6 | 88.6 | 49 | |
| | 48 | 100.1 | 99.3 | 98.5 | 97.7 | 96.9 | 96.0 | 95.2 | 94.3 | 93.4 | 92.5 | 91.6 | 90.7 | 89.8 | 88.8 | 87.8 | 48 | |
| | 47 | 99.5 | 98.7 | 97.9 | 97.1 | 96.2 | 95.4 | 94.5 | 93.6 | 92.8 | 91.8 | 90.9 | 90.0 | 89.0 | 88.0 | 87.0 | 47 | |
| | 46 | 99.0 | 98.1 | 97.3 | 96.5 | 95.6 | 94.7 | 93.8 | 92.9 | 92.0 | 91.1 | 90.2 | 89.2 | 88.2 | 87.3 | 86.2 | 46 | |
| 7-48 | 45 | 98.4 | 97.6 | 96.7 | 95.9 | 95.0 | 94.1 | 93.2 | 92.3 | 91.3 | 90.4 | 89.4 | 88.5 | 87.5 | 86.5 | 85.4 | 45 | 4-12 |
| | 44 | 97.8 | 97.0 | 96.1 | 95.2 | 94.3 | 93.4 | 92.5 | 91.6 | 90.7 | 89.7 | 88.7 | 87.7 | 86.7 | 85.7 | 94.7 | 44 | |
| | 43 | 97.3 | 96.4 | 95.5 | 94.6 | 93.7 | 92.8 | 91.9 | 90.9 | 90.0 | 89.0 | 88.0 | 87.0 | 86.0 | 84.9 | 83.9 | 43 | |
| | 42 | 96.7 | 95.8 | 94.9 | 94.0 | 93.1 | 92.2 | 91.2 | 90.2 | 89.3 | 88.3 | 87.3 | 86.2 | 85.2 | 84.1 | 83.1 | 42 | |
| | 41 | 96.1 | 95.2 | 94.3 | 93.4 | 92.4 | 91.5 | 90.5 | 89.5 | 88.6 | 87.5 | 86.5 | 85.5 | 84.4 | 83.4 | 82.3 | 41 | |
| | 49 | 99.8 | 99.0 | 98.3 | 97.5 | 96.7 | 95.9 | 95.0 | 94.2 | 93.3 | 92.5 | 91.6 | 90.7 | 89.8 | 88.9 | 87.9 | 49 | |
| | 48 | 99.3 | 98.5 | 97.7 | 96.9 | 96.1 | 95.2 | 94.4 | 93.5 | 92.7 | 91.8 | 90.9 | 90.0 | 89.0 | 88.1 | 87.1 | 48 | |
| | 47 | 98.7 | 97.9 | 97.1 | 96.3 | 95.5 | 94.6 | 93.7 | 92.9 | 92.0 | 91.1 | 90.2 | 89.2 | 88.3 | 87.3 | 86.3 | 47 | |
| | 46 | 98.2 | 97.4 | 96.5 | 95.7 | 94.9 | 94.0 | 93.1 | 92.2 | 91.3 | 90.4 | 89.5 | 88.5 | 87.5 | 86.6 | 85.6 | 46 | |
| 7-44 | 45 | 97.6 | 96.8 | 96.0 | 95.1 | 94.2 | 93.4 | 92.5 | 91.5 | 90.6 | 89.7 | 88.7 | 87.8 | 86.8 | 85.8 | 84.8 | 45 | 4-16 |
| | 44 | 97.1 | 96.2 | 95.4 | 94.5 | 93.6 | 92.7 | 91.8 | 90.9 | 90.0 | 89.0 | 88.0 | 87.0 | 86.1 | 85.0 | 84.0 | 44 | |
| | 43 | 96.5 | 95.7 | 94.8 | 93.9 | 93.0 | 92.1 | 91.2 | 90.2 | 89.3 | 88.3 | 87.3 | 86.3 | 85.3 | 84.3 | 83.2 | 43 | |
| | 42 | 96.0 | 95.1 | 94.2 | 93.3 | 92.4 | 91.5 | 90.5 | 89.6 | 88.6 | 87.6 | 86.6 | 85.6 | 84.6 | 83.5 | 82.5 | 42 | |
| | 41 | 95.4 | 94.5 | 93.6 | 92.7 | 91.8 | 90.8 | 89.9 | 88.9 | 87.9 | 86.9 | 85.9 | 84.9 | 83.8 | 82.8 | 81.7 | 41 | |
| | 49 | 99.0 | 98.2 | 97.5 | 96.7 | 95.9 | 95.1 | 94.2 | 93.4 | 92.6 | 91.7 | 90.8 | 89.9 | 89.0 | 88.1 | 87.2 | 49 | |
| | 48 | 98.5 | 97.7 | 96.9 | 96.1 | 95.3 | 94.5 | 93.6 | 92.8 | 91.9 | 91.0 | 90.1 | 89.2 | 88.3 | 87.4 | 86.4 | 48 | |
| | 47 | 97.9 | 97.1 | 96.3 | 95.5 | 94.7 | 93.8 | 93.0 | 92.1 | 91.2 | 90.3 | 89.4 | 88.5 | 87.6 | 86.6 | 85.6 | 47 | |
| | 46 | 97.4 | 96.6 | 95.8 | 94.9 | 94.1 | 93.2 | 92.4 | 91.5 | 90.6 | 89.7 | 88.7 | 87.8 | 86.8 | 85.9 | 84.9 | 46 | |
| 7-40 | 45 | 96.9 | 96.1 | 95.2 | 94.4 | 93.5 | 92.6 | 91.7 | 90.8 | 89.9 | 89.0 | 88.0 | 87.1 | 86.1 | 85.1 | 84.1 | 45 | 4-20 |
| | 44 | 96.4 | 95.5 | 94.7 | 93.8 | 92.9 | 92.0 | 91.1 | 90.2 | 89.3 | 88.3 | 87.4 | 86.4 | 85.4 | 84.4 | 83.4 | 44 | |
| | 43 | 95.8 | 95.0 | 94.1 | 93.2 | 92.3 | 91.4 | 90.5 | 89.5 | 88.6 | 87.6 | 86.7 | 85.7 | 84.7 | 83.7 | 82.6 | 43 | |
| | 42 | 95.3 | 94.4 | 93.5 | 92.6 | 91.7 | 90.8 | 89.9 | 88.9 | 87.9 | 87.0 | 86.0 | 85.0 | 84.0 | 82.9 | 81.9 | 42 | |
| | 41 | 94.7 | 93.8 | 92.9 | 92.0 | 91.1 | 90.2 | 89.2 | 88.3 | 87.3 | 86.3 | 85.3 | 84.3 | 83.2 | 82.2 | 81.2 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 109.4 | 108.7 | 108.1 | 107.4 | 106.8 | 106.1 | 105.4 | 104.7 | 104.1 | 103.4 | 102.7 | 101.9 | 101.2 | 100.5 | 99.7 | 49 | |
| | 48 | 109.1 | 108.5 | 107.8 | 107.1 | 106.4 | 105.8 | 105.1 | 104.4 | 103.7 | 102.9 | 102.2 | 101.5 | 100.7 | 100.0 | 99.2 | 48 | |
| | 47 | 108.8 | 108.2 | 107.5 | 106.8 | 106.1 | 105.4 | 104.7 | 104.0 | 103.2 | 102.5 | 101.8 | 101.0 | 100.3 | 99.5 | 98.7 | 47 | |
| | 46 | 108.6 | 107.9 | 107.2 | 106.5 | 105.7 | 105.0 | 104.3 | 103.6 | 102.8 | 102.1 | 101.3 | 100.6 | 99.8 | 99.0 | 98.2 | 46 | |
| 7-40 | 45 | 108.3 | 107.5 | 106.8 | 106.1 | 105.4 | 104.7 | 103.9 | 103.2 | 102.4 | 101.7 | 100.9 | 100.1 | 99.3 | 98.5 | 97.7 | 45 | 4-20 |
| | 44 | 108.0 | 107.2 | 106.5 | 105.8 | 105.0 | 104.3 | 103.5 | 102.8 | 102.0 | 101.2 | 100.4 | 99.6 | 98.8 | 98.0 | 97.2 | 44 | |
| | 43 | 107.7 | 106.9 | 106.2 | 105.4 | 104.7 | 103.9 | 103.1 | 102.4 | 101.6 | 100.8 | 100.0 | 99.2 | 98.3 | 97.5 | 96.7 | 43 | |
| | 42 | 107.3 | 106.6 | 105.8 | 105.1 | 104.3 | 103.5 | 102.7 | 101.9 | 101.1 | 100.3 | 99.5 | 98.7 | 97.9 | 97.0 | 96.1 | 42 | |
| | 41 | 107.0 | 106.3 | 105.5 | 104.5 | 103.9 | 103.1 | 102.3 | 101.5 | 100.7 | 99.9 | 99.0 | 98.2 | 97.4 | 96.5 | 95.6 | 41 | |
| | 49 | 108.6 | 107.9 | 107.3 | 106.6 | 106.0 | 105.3 | 104.6 | 103.9 | 103.2 | 102.5 | 101.8 | 101.1 | 100.4 | 99.7 | 98.9 | 49 | |
| | 48 | 108.3 | 107.7 | 107.0 | 106.3 | 105.6 | 104.9 | 104.3 | 103.6 | 102.8 | 102.1 | 101.4 | 100.7 | 99.9 | 99.2 | 98.4 | 48 | |
| | 47 | 108.0 | 107.4 | 106.7 | 106.0 | 105.3 | 104.6 | 103.9 | 103.2 | 102.5 | 101.7 | 101.0 | 100.2 | 99.5 | 98.7 | 97.9 | 47 | |
| | 46 | 107.8 | 107.1 | 106.4 | 105.7 | 105.0 | 104.3 | 103.5 | 102.8 | 102.1 | 101.3 | 100.6 | 99.8 | 99.0 | 98.2 | 97.5 | 46 | |
| 7-36 | 45 | 107.5 | 106.8 | 106.1 | 105.3 | 104.6 | 103.9 | 103.2 | 102.4 | 101.7 | 100.9 | 100.1 | 99.3 | 98.6 | 97.8 | 97.0 | 45 | 4-24 |
| | 44 | 107.2 | 106.5 | 105.8 | 105.0 | 104.3 | 103.5 | 102.8 | 102.0 | 101.2 | 100.5 | 99.7 | 98.9 | 98.1 | 97.3 | 96.5 | 44 | |
| | 43 | 106.9 | 106.2 | 105.4 | 104.7 | 103.9 | 103.2 | 102.4 | 101.6 | 100.8 | 100.0 | 99.2 | 98.4 | 97.6 | 96.8 | 96.0 | 43 | |
| | 42 | 106.6 | 105.9 | 105.1 | 104.3 | 103.6 | 102.8 | 102.0 | 101.2 | 100.4 | 99.6 | 98.8 | 98.0 | 97.1 | 96.3 | 95.4 | 42 | |
| | 41 | 106.3 | 105.5 | 104.8 | 104.0 | 103.2 | 102.4 | 101.6 | 100.8 | 100.0 | 99.2 | 98.3 | 97.5 | 96.7 | 95.8 | 94.9 | 41 | |
| | 49 | 107.8 | 107.1 | 106.5 | 105.8 | 105.1 | 104.5 | 103.8 | 103.1 | 102.4 | 101.7 | 101.0 | 100.3 | 99.6 | 98.9 | 98.1 | 49 | |
| | 48 | 107.5 | 106.9 | 106.2 | 105.5 | 104.8 | 104.1 | 103.5 | 102.8 | 102.0 | 101.3 | 100.6 | 99.9 | 99.2 | 98.4 | 97.7 | 48 | |
| | 47 | 107.2 | 106.6 | 105.9 | 105.2 | 104.5 | 103.8 | 103.1 | 102.4 | 101.7 | 100.9 | 100.2 | 99.5 | 98.7 | 97.9 | 97.2 | 47 | |
| | 46 | 107.0 | 106.3 | 105.6 | 104.9 | 104.2 | 103.5 | 102.7 | 102.0 | 101.3 | 100.5 | 99.8 | 99.0 | 98.3 | 97.5 | 96.7 | 46 | |
| 7-32 | 45 | 106.7 | 106.0 | 105.3 | 104.6 | 103.9 | 103.1 | 102.4 | 101.6 | 100.9 | 100.1 | 99.4 | 98.6 | 97.8 | 97.0 | 96.2 | 45 | 4-28 |
| | 44 | 106.4 | 105.7 | 105.0 | 104.3 | 103.5 | 102.8 | 102.0 | 101.3 | 100.5 | 99.7 | 98.9 | 98.1 | 97.3 | 96.5 | 95.7 | 44 | |
| | 43 | 106.1 | 105.4 | 104.7 | 103.9 | 103.2 | 102.4 | 101.6 | 100.9 | 100.1 | 99.3 | 98.5 | 97.7 | 96.9 | 96.1 | 95.2 | 43 | |
| | 42 | 105.9 | 105.1 | 104.4 | 103.6 | 102.8 | 102.0 | 101.3 | 100.5 | 99.7 | 98.9 | 98.1 | 97.2 | 96.4 | 95.6 | 94.7 | 42 | |
| | 41 | 105.6 | 104.8 | 104.0 | 103.3 | 102.5 | 101.7 | 100.9 | 100.1 | 99.3 | 98.5 | 97.6 | 96.8 | 96.0 | 95.1 | 94.2 | 41 | |
| | 49 | 107.0 | 106.3 | 105.7 | 105.0 | 104.3 | 103.7 | 103.0 | 102.3 | 101.6 | 100.9 | 100.2 | 99.5 | 98.8 | 98.1 | 97.3 | 49 | |
| | 48 | 106.7 | 106.1 | 105.4 | 104.7 | 104.0 | 103.3 | 102.7 | 102.0 | 101.2 | 100.5 | 99.8 | 99.1 | 98.4 | 97.6 | 96.9 | 48 | |
| | 47 | 106.5 | 105.8 | 105.1 | 104.4 | 103.7 | 103.0 | 102.3 | 101.6 | 100.9 | 100.2 | 99.4 | 98.7 | 97.9 | 97.2 | 96.4 | 47 | |
| | 46 | 106.2 | 105.5 | 104.8 | 104.1 | 103.4 | 102.7 | 102.0 | 101.2 | 100.5 | 99.8 | 99.0 | 98.3 | 97.5 | 96.7 | 95.9 | 46 | |
| 7-28 | 45 | 105.9 | 105.2 | 104.5 | 103.8 | 103.1 | 102.4 | 101.6 | 100.9 | 100.1 | 99.4 | 98.6 | 97.8 | 97.0 | 96.3 | 95.5 | 45 | 4-32 |
| | 44 | 105.7 | 105.0 | 104.2 | 103.5 | 102.8 | 102.0 | 101.3 | 100.5 | 99.7 | 99.0 | 98.2 | 97.4 | 96.6 | 95.8 | 95.0 | 44 | |
| | 43 | 105.4 | 104.7 | 103.9 | 103.2 | 102.4 | 101.7 | 100.9 | 100.1 | 99.4 | 98.6 | 97.8 | 97.0 | 96.2 | 95.4 | 94.5 | 43 | |
| | 42 | 105.1 | 104.4 | 103.6 | 102.9 | 102.1 | 101.3 | 100.5 | 99.8 | 99.0 | 98.2 | 97.4 | 96.5 | 95.7 | 94.9 | 94.0 | 42 | |
| | 41 | 104.9 | 104.1 | 103.3 | 102.5 | 101.8 | 101.0 | 100.2 | 99.4 | 98.6 | 97.8 | 96.9 | 96.1 | 95.3 | 94.4 | 93.6 | 41 | |
| | 49 | 106.2 | 105.5 | 104.9 | 104.2 | 103.5 | 102.9 | 102.2 | 101.5 | 100.8 | 100.1 | 99.4 | 98.7 | 98.0 | 97.3 | 96.5 | 49 | |
| | 48 | 105.9 | 105.3 | 104.6 | 103.9 | 103.2 | 102.6 | 101.9 | 101.2 | 100.5 | 99.7 | 99.0 | 98.3 | 97.6 | 96.8 | 96.1 | 48 | |
| | 47 | 105.7 | 105.0 | 104.3 | 103.6 | 102.9 | 102.2 | 101.5 | 100.8 | 100.1 | 99.4 | 98.6 | 97.9 | 97.2 | 96.4 | 95.6 | 47 | |
| | 46 | 105.4 | 104.7 | 104.1 | 103.4 | 102.6 | 101.9 | 101.2 | 100.5 | 99.7 | 99.0 | 98.3 | 97.5 | 96.7 | 96.0 | 95.2 | 46 | |
| 7-24 | 45 | 105.2 | 104.5 | 103.8 | 103.1 | 102.3 | 101.6 | 100.9 | 100.1 | 99.4 | 98.6 | 97.9 | 97.1 | 96.3 | 95.5 | 94.7 | 45 | 4-36 |
| | 44 | 104.9 | 104.2 | 103.5 | 102.9 | 102.0 | 101.3 | 100.5 | 99.8 | 99.0 | 98.2 | 97.5 | 96.7 | 95.9 | 95.1 | 94.3 | 44 | |
| | 43 | 104.7 | 104.0 | 103.2 | 102.5 | 101.7 | 100.9 | 100.2 | 99.4 | 98.6 | 97.9 | 97.1 | 96.3 | 95.5 | 94.6 | 93.8 | 43 | |
| | 42 | 104.4 | 103.7 | 102.9 | 102.2 | 101.4 | 100.6 | 99.8 | 99.0 | 98.3 | 97.5 | 96.7 | 95.8 | 95.0 | 94.2 | 93.4 | 42 | |
| | 41 | 104.1 | 103.4 | 102.6 | 101.8 | 101.1 | 100.3 | 99.5 | 98.7 | 97.9 | 97.1 | 96.3 | 95.4 | 94.6 | 93.7 | 92.9 | 41 | |
| | 49 | 105.4 | 104.7 | 104.1 | 103.4 | 102.7 | 102.1 | 101.4 | 100.7 | 100.0 | 99.3 | 98.6 | 97.9 | 97.2 | 96.5 | 95.8 | 49 | |
| | 48 | 105.1 | 104.5 | 103.8 | 103.1 | 102.5 | 101.8 | 101.1 | 100.4 | 99.7 | 99.0 | 98.3 | 97.5 | 96.8 | 96.1 | 95.3 | 48 | |
| | 47 | 104.9 | 104.2 | 103.5 | 102.9 | 102.2 | 101.5 | 100.8 | 100.0 | 99.3 | 98.6 | 97.9 | 97.1 | 96.4 | 95.6 | 94.9 | 47 | |
| | 46 | 104.7 | 104.0 | 103.3 | 102.6 | 101.9 | 101.2 | 100.4 | 99.7 | 99.0 | 98.2 | 97.5 | 96.7 | 96.0 | 95.2 | 94.4 | 46 | |
| 7-20 | 45 | 104.4 | 103.7 | 103.0 | 102.3 | 101.6 | 100.9 | 100.1 | 99.4 | 98.6 | 97.9 | 97.1 | 96.3 | 95.6 | 94.8 | 94.0 | 45 | 4-40 |
| | 44 | 104.2 | 103.5 | 102.7 | 102.0 | 101.3 | 100.5 | 99.8 | 99.0 | 98.3 | 97.5 | 96.7 | 95.9 | 95.2 | 94.4 | 93.6 | 44 | |
| | 43 | 103.9 | 103.2 | 102.5 | 101.7 | 101.0 | 100.2 | 99.5 | 98.7 | 97.9 | 97.1 | 96.3 | 95.5 | 94.7 | 93.9 | 93.1 | 43 | |
| | 42 | 103.7 | 102.9 | 102.2 | 101.4 | 100.7 | 99.9 | 99.1 | 98.3 | 97.5 | 96.8 | 96.0 | 95.1 | 94.3 | 93.5 | 92.7 | 42 | |
| | 41 | 103.4 | 102.7 | 101.9 | 101.1 | 100.4 | 99.6 | 98.8 | 98.0 | 97.2 | 96.4 | 95.6 | 94.7 | 93.9 | 93.1 | 92.2 | 41 | |
| | 49 | 104.6 | 103.9 | 103.3 | 102.6 | 101.9 | 101.3 | 100.6 | 99.9 | 99.2 | 98.5 | 97.8 | 97.1 | 96.4 | 95.7 | 95.0 | 49 | |
| | 48 | 104.4 | 103.7 | 103.0 | 102.4 | 101.7 | 101.0 | 100.3 | 99.6 | 98.9 | 98.2 | 97.5 | 96.7 | 96.0 | 95.3 | 94.6 | 48 | |
| | 47 | 104.1 | 103.5 | 102.8 | 102.1 | 101.4 | 100.7 | 100.0 | 99.3 | 98.6 | 97.8 | 97.1 | 96.4 | 95.6 | 94.9 | 94.1 | 47 | |
| | 46 | 103.9 | 103.2 | 102.5 | 101.8 | 101.1 | 100.4 | 99.7 | 99.0 | 98.2 | 97.5 | 96.7 | 96.0 | 95.2 | 94.5 | 93.7 | 46 | |
| 7-16 | 45 | 103.7 | 103.0 | 102.3 | 101.6 | 100.8 | 100.1 | 99.4 | 98.6 | 97.9 | 97.1 | 96.4 | 95.6 | 94.8 | 94.1 | 93.3 | 45 | 4-44 |
| | 44 | 103.5 | 102.7 | 102.0 | 101.3 | 100.5 | 99.8 | 99.1 | 98.3 | 97.5 | 96.8 | 96.0 | 95.2 | 94.4 | 93.7 | 92.8 | 44 | |
| | 43 | 103.2 | 102.5 | 101.7 | 101.0 | 100.2 | 99.5 | 98.7 | 98.0 | 97.2 | 96.4 | 95.6 | 94.8 | 94.0 | 93.2 | 92.4 | 43 | |
| | 42 | 103.0 | 102.2 | 101.5 | 100.7 | 100.0 | 99.2 | 98.4 | 97.6 | 96.8 | 96.1 | 95.3 | 94.4 | 93.6 | 92.8 | 92.0 | 42 | |
| | 41 | 102.7 | 102.0 | 101.2 | 100.4 | 99.7 | 98.9 | 98.1 | 97.3 | 96.5 | 95.7 | 94.9 | 94.1 | 93.2 | 92.4 | 91.5 | 41 | |
| | 49 | 103.8 | 103.1 | 102.5 | 101.8 | 101.2 | 100.5 | 99.8 | 99.1 | 98.4 | 97.7 | 97.0 | 96.3 | 95.6 | 94.9 | 94.2 | 49 | |
| | 48 | 103.6 | 102.9 | 102.2 | 101.6 | 100.9 | 100.2 | 99.5 | 98.8 | 98.1 | 97.4 | 96.6 | 96.0 | 95.3 | 94.5 | 93.8 | 48 | |
| | 47 | 103.4 | 102.7 | 102.0 | 101.3 | 100.6 | 99.9 | 99.2 | 98.5 | 97.8 | 97.1 | 96.3 | 95.6 | 94.9 | 94.1 | 93.4 | 47 | |
| | 46 | 103.2 | 102.5 | 101.8 | 101.1 | 100.4 | 99.6 | 98.9 | 98.2 | 97.5 | 96.7 | 96.0 | 95.2 | 94.5 | 93.7 | 93.0 | 46 | |
| 7-12 | 45 | 102.9 | 102.2 | 101.5 | 100.8 | 100.1 | 99.4 | 98.6 | 97.9 | 97.1 | 96.4 | 95.6 | 94.9 | 94.1 | 93.3 | 92.6 | 45 | 4-48 |
| | 44 | 102.7 | 102.0 | 101.3 | 100.5 | 99.8 | 99.1 | 98.3 | 97.6 | 96.8 | 96.1 | 95.3 | 94.5 | 93.7 | 92.9 | 92.1 | 44 | |
| | 43 | 102.5 | 101.8 | 101.0 | 100.3 | 99.5 | 98.8 | 98.0 | 97.2 | 96.5 | 95.7 | 94.9 | 94.1 | 93.3 | 92.5 | 91.7 | 43 | |
| | 42 | 102.3 | 101.5 | 100.8 | 100.0 | 99.3 | 98.5 | 97.7 | 96.9 | 96.1 | 95.4 | 94.6 | 93.8 | 92.9 | 92.1 | 91.3 | 42 | |
| | 41 | 102.0 | 101.3 | 100.5 | 99.7 | 99.0 | 98.2 | 97.4 | 96.6 | 95.8 | 95.0 | 94.2 | 93.4 | 92.6 | 91.7 | 90.9 | 41 | |
| | 49 | 103.0 | 102.3 | 101.7 | 101.0 | 100.4 | 99.7 | 99.0 | 98.3 | 97.7 | 97.0 | 96.3 | 95.6 | 94.9 | 94.1 | 93.4 | 49 | |
| | 48 | 102.8 | 102.1 | 101.5 | 100.8 | 100.1 | 99.4 | 98.7 | 98.1 | 97.4 | 96.6 | 95.9 | 95.2 | 94.5 | 93.8 | 93.0 | 48 | |
| | 47 | 102.6 | 101.9 | 101.2 | 100.6 | 99.9 | 99.2 | 98.5 | 97.7 | 97.0 | 96.3 | 95.6 | 94.9 | 94.1 | 93.4 | 92.6 | 47 | |
| | 46 | 102.4 | 101.7 | 101.0 | 100.3 | 99.6 | 98.9 | 98.2 | 97.5 | 96.7 | 96.0 | 95.3 | 94.5 | 93.8 | 93.0 | 92.2 | 46 | |
| 7-08 | 45 | 102.2 | 101.5 | 100.8 | 100.1 | 99.4 | 98.6 | 97.9 | 97.2 | 96.4 | 95.7 | 94.9 | 94.2 | 93.4 | 92.6 | 91.8 | 45 | 4-52 |
| | 44 | 102.0 | 101.3 | 100.5 | 99.8 | 99.1 | 98.3 | 97.6 | 96.8 | 96.1 | 95.3 | 94.6 | 93.8 | 93.0 | 92.2 | 91.4 | 44 | |
| | 43 | 101.8 | 101.1 | 100.3 | 99.6 | 98.8 | 98.1 | 97.3 | 96.5 | 95.8 | 95.0 | 94.2 | 93.4 | 92.6 | 91.8 | 91.0 | 43 | |
| | 42 | 101.6 | 100.8 | 100.1 | 99.3 | 98.6 | 97.8 | 97.0 | 96.2 | 95.4 | 94.7 | 93.9 | 93.1 | 92.3 | 91.4 | 90.6 | 42 | |
| | 41 | 101.3 | 100.6 | 99.8 | 99.1 | 98.3 | 97.5 | 96.7 | 95.9 | 95.1 | 94.3 | 93.5 | 92.7 | 91.9 | 91.1 | 90.2 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 99.0 | 98.2 | 97.5 | 96.7 | 95.9 | 95.1 | 94.2 | 93.4 | 92.6 | 91.7 | 90.8 | 89.9 | 89.0 | 88.1 | 87.2 | 49 | |
| | 48 | 98.5 | 97.7 | 96.9 | 96.1 | 95.3 | 94.5 | 93.6 | 92.8 | 91.9 | 91.0 | 90.1 | 89.2 | 88.3 | 87.4 | 86.4 | 48 | |
| | 47 | 97.9 | 97.1 | 96.3 | 95.5 | 94.7 | 93.8 | 93.0 | 92.1 | 91.2 | 90.3 | 89.4 | 88.5 | 87.6 | 86.6 | 85.6 | 47 | |
| | 46 | 97.4 | 96.6 | 95.8 | 94.9 | 94.1 | 93.2 | 92.4 | 91.5 | 90.6 | 89.7 | 88.7 | 87.8 | 86.8 | 85.9 | 84.9 | 46 | |
| 7-40 | 45 | 96.9 | 96.1 | 95.2 | 94.4 | 93.5 | 92.6 | 91.7 | 90.8 | 89.9 | 89.0 | 88.0 | 87.1 | 86.1 | 85.1 | 84.1 | 45 | 4-20 |
| | 44 | 96.4 | 95.5 | 94.7 | 93.8 | 92.9 | 92.0 | 91.1 | 90.2 | 89.3 | 88.3 | 87.4 | 86.4 | 85.4 | 84.4 | 83.4 | 44 | |
| | 43 | 95.8 | 95.0 | 94.1 | 93.2 | 92.3 | 91.4 | 90.5 | 89.5 | 88.6 | 87.6 | 86.7 | 85.7 | 84.7 | 83.7 | 82.6 | 43 | |
| | 42 | 95.3 | 94.4 | 93.5 | 92.6 | 91.7 | 90.8 | 89.9 | 88.9 | 87.9 | 87.0 | 86.0 | 85.0 | 84.0 | 82.9 | 81.9 | 42 | |
| | 41 | 94.7 | 93.8 | 92.9 | 92.0 | 91.1 | 90.2 | 89.2 | 88.3 | 87.3 | 86.3 | 85.3 | 84.3 | 83.2 | 82.2 | 81.2 | 41 | |
| | 49 | 98.2 | 97.4 | 96.7 | 95.9 | 95.1 | 94.3 | 93.5 | 92.6 | 91.8 | 90.9 | 90.1 | 89.2 | 88.3 | 87.4 | 86.4 | 49 | |
| | 48 | 97.7 | 96.9 | 96.1 | 95.3 | 94.5 | 93.7 | 92.9 | 92.0 | 91.2 | 90.3 | 89.4 | 88.5 | 87.6 | 86.6 | 85.7 | 48 | |
| | 47 | 97.2 | 96.4 | 95.6 | 94.7 | 93.9 | 93.1 | 92.2 | 91.4 | 90.5 | 89.6 | 88.7 | 87.8 | 86.9 | 85.9 | 85.0 | 47 | |
| | 46 | 96.7 | 95.8 | 95.0 | 94.2 | 93.4 | 92.5 | 91.6 | 90.7 | 89.9 | 89.0 | 88.0 | 87.1 | 86.2 | 85.2 | 84.2 | 46 | |
| 7-36 | 45 | 96.1 | 95.3 | 94.5 | 93.6 | 92.8 | 91.9 | 91.0 | 90.1 | 89.2 | 88.3 | 87.4 | 86.4 | 85.5 | 84.5 | 83.5 | 45 | 4-24 |
| | 44 | 95.6 | 94.8 | 93.9 | 93.1 | 92.2 | 91.3 | 90.4 | 89.5 | 88.6 | 87.6 | 86.7 | 85.7 | 84.7 | 83.8 | 82.8 | 44 | |
| | 43 | 95.1 | 94.2 | 93.4 | 92.5 | 91.6 | 90.7 | 89.8 | 88.9 | 87.9 | 87.0 | 86.0 | 85.0 | 84.0 | 83.0 | 82.0 | 43 | |
| | 42 | 94.6 | 93.7 | 92.8 | 91.9 | 91.0 | 90.1 | 89.2 | 88.2 | 87.3 | 86.3 | 85.3 | 84.4 | 83.4 | 82.3 | 81.3 | 42 | |
| | 41 | 94.1 | 93.2 | 92.3 | 91.4 | 90.4 | 89.5 | 88.6 | 87.6 | 86.7 | 85.7 | 84.7 | 83.7 | 82.7 | 81.6 | 80.6 | 41 | |
| | 49 | 97.4 | 96.6 | 95.9 | 95.1 | 94.3 | 93.5 | 92.7 | 91.9 | 91.0 | 90.2 | 89.3 | 88.4 | 87.6 | 86.6 | 85.7 | 49 | |
| | 48 | 96.9 | 96.1 | 95.3 | 94.5 | 93.7 | 92.9 | 92.1 | 91.3 | 90.4 | 89.5 | 88.7 | 87.8 | 86.9 | 85.9 | 85.0 | 48 | |
| | 47 | 96.4 | 95.6 | 94.8 | 94.0 | 93.2 | 92.3 | 91.5 | 90.6 | 89.8 | 88.9 | 88.0 | 87.1 | 86.2 | 85.2 | 84.3 | 47 | |
| | 46 | 95.9 | 95.1 | 94.3 | 93.4 | 92.6 | 91.8 | 90.9 | 90.0 | 89.1 | 88.2 | 87.3 | 86.4 | 85.5 | 84.5 | 83.6 | 46 | |
| 7-32 | 45 | 95.4 | 94.6 | 93.7 | 92.9 | 92.0 | 91.2 | 90.3 | 89.4 | 88.5 | 87.6 | 86.7 | 85.7 | 84.8 | 83.8 | 82.8 | 45 | 4-28 |
| | 44 | 94.9 | 94.1 | 93.2 | 92.3 | 91.5 | 90.6 | 89.7 | 88.8 | 87.9 | 87.0 | 86.0 | 85.1 | 84.1 | 83.1 | 82.1 | 44 | |
| | 43 | 94.4 | 93.5 | 92.7 | 91.8 | 90.9 | 90.0 | 89.1 | 88.2 | 87.3 | 86.3 | 85.4 | 84.4 | 83.4 | 82.4 | 81.4 | 43 | |
| | 42 | 93.9 | 93.0 | 92.1 | 91.3 | 90.4 | 89.5 | 88.5 | 87.6 | 86.6 | 85.7 | 84.7 | 83.7 | 82.7 | 81.7 | 80.7 | 42 | |
| | 41 | 93.4 | 92.5 | 91.6 | 90.7 | 89.8 | 88.9 | 87.9 | 87.0 | 86.0 | 85.1 | 84.1 | 83.1 | 82.1 | 81.1 | 80.0 | 41 | |
| | 49 | 96.6 | 95.8 | 95.1 | 94.3 | 93.5 | 92.7 | 91.9 | 91.1 | 90.3 | 89.4 | 88.6 | 87.7 | 86.8 | 85.9 | 85.0 | 49 | |
| | 48 | 96.1 | 95.3 | 94.6 | 93.8 | 93.0 | 92.2 | 91.3 | 90.5 | 89.7 | 88.8 | 87.9 | 87.0 | 86.1 | 85.2 | 84.3 | 48 | |
| | 47 | 95.6 | 94.8 | 94.0 | 93.2 | 92.4 | 91.6 | 90.8 | 89.9 | 89.0 | 88.2 | 87.3 | 86.4 | 85.5 | 84.5 | 83.6 | 47 | |
| | 46 | 95.1 | 94.3 | 93.5 | 92.7 | 91.9 | 91.0 | 90.2 | 89.3 | 88.4 | 87.5 | 86.6 | 85.7 | 84.8 | 83.9 | 82.9 | 46 | |
| 7-28 | 45 | 94.7 | 93.8 | 93.0 | 92.2 | 91.3 | 90.5 | 89.6 | 88.7 | 87.8 | 86.9 | 86.0 | 85.1 | 84.1 | 83.2 | 82.2 | 45 | 4-32 |
| | 44 | 94.2 | 93.3 | 92.5 | 91.6 | 90.8 | 89.9 | 89.0 | 88.1 | 87.2 | 86.3 | 85.4 | 84.4 | 83.5 | 82.5 | 81.5 | 44 | |
| | 43 | 93.7 | 92.8 | 92.0 | 91.1 | 90.2 | 89.3 | 88.4 | 87.5 | 86.6 | 85.7 | 84.7 | 83.8 | 82.8 | 81.8 | 80.8 | 43 | |
| | 42 | 93.2 | 92.3 | 91.5 | 90.6 | 89.7 | 88.8 | 87.9 | 86.9 | 86.0 | 85.1 | 84.1 | 83.1 | 82.1 | 81.1 | 80.1 | 42 | |
| | 41 | 92.7 | 91.8 | 90.9 | 90.0 | 89.1 | 88.2 | 87.3 | 86.4 | 85.4 | 84.4 | 83.5 | 82.5 | 81.5 | 80.5 | 79.5 | 41 | |
| | 49 | 95.8 | 95.0 | 94.3 | 93.5 | 92.7 | 92.0 | 91.1 | 90.3 | 89.5 | 88.7 | 87.8 | 87.0 | 86.1 | 85.2 | 84.3 | 49 | |
| | 48 | 95.3 | 94.6 | 93.8 | 93.0 | 92.2 | 91.4 | 90.6 | 89.8 | 88.9 | 88.1 | 87.2 | 86.3 | 85.4 | 84.5 | 83.6 | 48 | |
| | 47 | 94.9 | 94.1 | 93.3 | 92.5 | 91.7 | 90.9 | 90.0 | 89.2 | 88.3 | 87.5 | 86.6 | 85.7 | 84.8 | 83.9 | 82.9 | 47 | |
| | 46 | 94.4 | 93.6 | 92.8 | 92.0 | 91.1 | 90.3 | 89.5 | 88.6 | 87.7 | 86.8 | 85.9 | 85.0 | 84.1 | 83.2 | 82.2 | 46 | |
| 7-24 | 45 | 93.9 | 93.1 | 92.3 | 91.5 | 90.6 | 89.8 | 88.9 | 88.0 | 87.1 | 86.2 | 85.3 | 84.4 | 83.5 | 82.5 | 81.6 | 45 | 4-36 |
| | 44 | 93.5 | 92.6 | 91.8 | 90.9 | 90.1 | 89.2 | 88.3 | 87.4 | 86.5 | 85.6 | 84.7 | 83.8 | 82.8 | 81.9 | 80.9 | 44 | |
| | 43 | 93.0 | 92.1 | 91.3 | 90.4 | 89.5 | 88.7 | 87.8 | 86.9 | 86.0 | 85.0 | 84.1 | 83.1 | 82.2 | 81.2 | 80.2 | 43 | |
| | 42 | 92.5 | 91.6 | 90.8 | 89.9 | 89.0 | 88.1 | 87.2 | 86.3 | 85.4 | 84.4 | 83.5 | 82.5 | 81.5 | 80.6 | 79.6 | 42 | |
| | 41 | 92.0 | 91.2 | 90.3 | 89.4 | 88.5 | 87.6 | 86.7 | 85.7 | 84.8 | 83.8 | 82.9 | 81.9 | 80.9 | 79.9 | 78.9 | 41 | |
| | 49 | 95.0 | 94.3 | 93.5 | 92.7 | 92.0 | 91.2 | 90.4 | 89.6 | 88.8 | 87.9 | 87.1 | 86.2 | 85.4 | 84.5 | 83.6 | 49 | |
| | 48 | 94.6 | 93.8 | 93.0 | 92.2 | 91.5 | 90.7 | 89.8 | 89.0 | 88.2 | 87.3 | 86.5 | 85.6 | 84.7 | 83.8 | 82.9 | 48 | |
| | 47 | 94.1 | 93.3 | 92.5 | 91.7 | 90.9 | 90.1 | 89.3 | 88.5 | 87.6 | 86.7 | 85.9 | 85.0 | 84.1 | 83.2 | 82.2 | 47 | |
| | 46 | 93.7 | 92.9 | 92.1 | 91.2 | 90.4 | 89.6 | 88.7 | 87.9 | 87.0 | 86.1 | 85.3 | 84.4 | 83.4 | 82.5 | 81.6 | 46 | |
| 7-20 | 45 | 93.2 | 92.4 | 91.6 | 90.7 | 89.9 | 89.1 | 88.2 | 87.3 | 86.5 | 85.6 | 84.7 | 83.7 | 82.8 | 81.9 | 80.9 | 45 | 4-40 |
| | 44 | 92.7 | 91.9 | 91.1 | 90.2 | 89.4 | 88.5 | 87.7 | 86.8 | 85.9 | 85.0 | 84.1 | 83.1 | 82.2 | 81.2 | 80.3 | 44 | |
| | 43 | 92.3 | 91.4 | 90.6 | 89.7 | 88.9 | 88.0 | 87.1 | 86.2 | 85.3 | 84.4 | 83.5 | 82.5 | 81.6 | 80.6 | 79.6 | 43 | |
| | 42 | 91.8 | 91.0 | 90.1 | 89.2 | 88.4 | 87.5 | 86.6 | 85.7 | 84.7 | 83.8 | 82.9 | 81.9 | 80.9 | 80.0 | 79.0 | 42 | |
| | 41 | 91.4 | 90.5 | 89.6 | 88.7 | 87.8 | 86.9 | 86.0 | 85.1 | 84.2 | 83.2 | 82.3 | 81.3 | 80.3 | 79.3 | 78.3 | 41 | |
| | 49 | 94.2 | 93.5 | 92.7 | 92.0 | 91.2 | 90.4 | 89.6 | 88.7 | 88.0 | 87.2 | 86.4 | 85.5 | 84.6 | 83.8 | 82.9 | 49 | |
| | 48 | 93.8 | 93.0 | 92.3 | 91.5 | 90.7 | 89.9 | 89.1 | 88.3 | 87.5 | 86.6 | 85.8 | 84.9 | 84.0 | 83.1 | 82.2 | 48 | |
| | 47 | 93.4 | 92.6 | 91.8 | 91.0 | 90.2 | 89.4 | 88.6 | 87.7 | 86.9 | 86.0 | 85.2 | 84.3 | 83.4 | 82.5 | 81.6 | 47 | |
| | 46 | 92.9 | 92.1 | 91.3 | 90.5 | 89.7 | 88.9 | 88.0 | 87.2 | 86.3 | 85.5 | 84.6 | 83.7 | 82.8 | 81.9 | 80.9 | 46 | |
| 7-16 | 45 | 92.5 | 91.7 | 90.9 | 90.0 | 89.2 | 88.4 | 87.5 | 86.6 | 85.9 | 84.9 | 84.0 | 83.1 | 82.2 | 81.2 | 80.3 | 45 | 4-44 |
| | 44 | 92.0 | 91.2 | 90.4 | 89.5 | 88.7 | 87.8 | 87.0 | 86.1 | 85.2 | 84.3 | 83.4 | 82.5 | 81.6 | 80.6 | 79.7 | 44 | |
| | 43 | 91.6 | 90.8 | 89.9 | 89.1 | 88.2 | 87.3 | 86.4 | 85.6 | 84.7 | 83.7 | 82.8 | 81.9 | 80.9 | 80.0 | 79.0 | 43 | |
| | 42 | 91.1 | 90.3 | 89.4 | 88.6 | 87.7 | 86.8 | 85.9 | 85.0 | 84.1 | 83.2 | 82.2 | 81.3 | 80.3 | 79.4 | 78.5 | 42 | |
| | 41 | 90.7 | 89.8 | 89.0 | 88.1 | 87.2 | 86.3 | 85.4 | 84.5 | 83.6 | 82.6 | 81.7 | 80.7 | 79.8 | 78.8 | 77.8 | 41 | |
| | 49 | 93.5 | 92.7 | 92.0 | 91.2 | 90.4 | 89.7 | 88.9 | 88.1 | 87.3 | 86.5 | 85.6 | 84.8 | 83.9 | 83.1 | 82.2 | 49 | |
| | 48 | 93.0 | 92.3 | 91.5 | 90.7 | 89.9 | 89.2 | 88.4 | 87.6 | 86.7 | 85.9 | 85.1 | 84.2 | 83.3 | 82.4 | 81.6 | 48 | |
| | 47 | 92.6 | 91.8 | 91.1 | 90.3 | 89.5 | 88.7 | 87.9 | 87.0 | 86.2 | 85.3 | 84.5 | 83.6 | 82.7 | 81.8 | 80.9 | 47 | |
| | 46 | 92.2 | 91.4 | 90.6 | 89.8 | 89.0 | 88.2 | 87.3 | 86.5 | 85.6 | 84.8 | 83.9 | 83.0 | 82.1 | 81.2 | 80.3 | 46 | |
| 7-12 | 45 | 91.8 | 91.0 | 90.1 | 89.3 | 88.5 | 87.7 | 86.8 | 86.0 | 85.1 | 84.2 | 83.3 | 82.4 | 81.5 | 80.6 | 79.7 | 45 | 4-48 |
| | 44 | 91.3 | 90.5 | 89.7 | 88.8 | 88.0 | 87.2 | 86.3 | 85.4 | 84.5 | 83.7 | 82.8 | 81.8 | 80.9 | 80.0 | 79.0 | 44 | |
| | 43 | 90.9 | 90.1 | 89.2 | 88.4 | 87.5 | 86.7 | 85.8 | 84.9 | 84.0 | 83.1 | 82.2 | 81.3 | 80.3 | 79.4 | 78.4 | 43 | |
| | 42 | 90.5 | 89.6 | 88.8 | 87.9 | 87.1 | 86.2 | 85.3 | 84.4 | 83.5 | 82.6 | 81.6 | 80.7 | 79.8 | 78.8 | 77.8 | 42 | |
| | 41 | 90.0 | 89.2 | 88.3 | 87.5 | 86.6 | 85.7 | 84.8 | 83.9 | 83.0 | 82.0 | 81.1 | 80.1 | 79.2 | 78.2 | 77.2 | 41 | |
| | 49 | 92.7 | 92.0 | 91.2 | 90.4 | 89.7 | 88.9 | 88.1 | 87.3 | 86.6 | 85.7 | 84.9 | 84.1 | 83.2 | 82.4 | 81.5 | 49 | |
| | 48 | 92.3 | 91.5 | 90.8 | 90.0 | 89.2 | 88.4 | 87.6 | 86.8 | 86.0 | 85.2 | 84.3 | 83.5 | 82.6 | 81.8 | 80.9 | 48 | |
| | 47 | 91.9 | 91.1 | 90.3 | 89.5 | 88.7 | 87.9 | 87.1 | 86.3 | 85.5 | 84.6 | 83.8 | 82.9 | 82.0 | 81.2 | 80.3 | 47 | |
| | 46 | 91.5 | 90.7 | 89.9 | 89.1 | 88.3 | 87.5 | 86.6 | 85.8 | 85.0 | 84.1 | 83.2 | 82.3 | 81.5 | 80.6 | 79.6 | 46 | |
| 7-08 | 45 | 91.0 | 90.2 | 89.4 | 88.6 | 87.8 | 87.0 | 86.1 | 85.3 | 84.4 | 83.6 | 82.7 | 81.8 | 80.9 | 80.0 | 79.0 | 45 | 4-52 |
| | 44 | 90.6 | 89.8 | 89.0 | 88.2 | 87.3 | 86.5 | 85.6 | 84.8 | 83.9 | 83.0 | 82.1 | 81.2 | 80.3 | 79.4 | 78.4 | 44 | |
| | 43 | 90.2 | 89.4 | 88.6 | 87.7 | 86.9 | 86.0 | 85.1 | 84.3 | 83.4 | 82.5 | 81.6 | 80.7 | 79.7 | 78.8 | 77.8 | 43 | |
| | 42 | 89.8 | 89.0 | 88.1 | 87.3 | 86.4 | 85.5 | 84.7 | 83.8 | 82.9 | 82.0 | 81.0 | 80.1 | 79.2 | 78.2 | 77.3 | 42 | |
| | 41 | 89.4 | 88.5 | 87.7 | 86.8 | 85.9 | 85.1 | 84.2 | 83.3 | 82.4 | 81.4 | 80.5 | 79.6 | 78.6 | 77.6 | 76.7 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A.M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 103.0 | 102.3 | 101.7 | 101.0 | 100.4 | 99.7 | 99.0 | 98.3 | 97.7 | 97.0 | 96.3 | 95.6 | 94.9 | 94.1 | 93.4 | 49 | |
| | 48 | 102.8 | 102.1 | 101.5 | 100.8 | 100.1 | 99.4 | 98.7 | 98.1 | 97.4 | 96.6 | 95.9 | 95.2 | 94.5 | 93.8 | 93.0 | 48 | |
| | 47 | 102.6 | 101.9 | 101.2 | 100.6 | 99.9 | 99.2 | 98.5 | 97.7 | 97.0 | 96.3 | 95.6 | 94.9 | 94.1 | 93.4 | 92.6 | 47 | |
| 7-08 | 46 | 102.4 | 101.7 | 101.0 | 100.3 | 99.6 | 98.9 | 98.2 | 97.5 | 96.7 | 96.0 | 95.3 | 94.5 | 93.8 | 93.0 | 92.2 | 46 | 4-52 |
| | 45 | 102.2 | 101.5 | 100.8 | 100.1 | 99.4 | 98.6 | 97.9 | 97.2 | 96.4 | 95.7 | 94.9 | 94.2 | 93.4 | 92.6 | 91.8 | 45 | |
| | 44 | 102.0 | 101.3 | 100.5 | 99.8 | 99.1 | 98.3 | 97.6 | 96.8 | 96.1 | 95.3 | 94.6 | 93.8 | 93.0 | 92.2 | 91.4 | 44 | |
| | 43 | 101.8 | 101.1 | 100.3 | 99.6 | 98.8 | 98.1 | 97.3 | 96.5 | 95.8 | 95.0 | 94.2 | 93.4 | 92.6 | 91.8 | 91.0 | 43 | |
| | 42 | 101.6 | 100.8 | 100.1 | 99.3 | 98.6 | 97.8 | 97.0 | 96.2 | 95.4 | 94.7 | 93.9 | 93.1 | 92.3 | 91.4 | 90.6 | 42 | |
| | 41 | 101.3 | 100.6 | 99.8 | 99.1 | 98.3 | 97.5 | 96.7 | 95.9 | 95.1 | 94.3 | 93.5 | 92.7 | 91.9 | 91.1 | 90.2 | 41 | |
| | 49 | 102.2 | 101.6 | 100.9 | 100.3 | 99.6 | 98.9 | 98.2 | 97.6 | 96.9 | 96.2 | 95.5 | 94.8 | 94.1 | 93.4 | 92.7 | 49 | |
| | 48 | 102.0 | 101.4 | 100.7 | 100.0 | 99.3 | 98.7 | 98.0 | 97.3 | 96.6 | 95.9 | 95.2 | 94.4 | 93.7 | 93.0 | 92.3 | 48 | |
| | 47 | 101.8 | 101.2 | 100.5 | 99.8 | 99.1 | 98.4 | 97.7 | 97.0 | 96.3 | 95.6 | 94.8 | 94.1 | 93.4 | 92.6 | 91.9 | 47 | |
| 7-04 | 46 | 101.7 | 101.0 | 100.3 | 99.6 | 98.9 | 98.1 | 97.4 | 96.7 | 96.0 | 95.3 | 94.5 | 93.8 | 93.0 | 92.3 | 91.5 | 46 | 4-56 |
| | 45 | 101.5 | 100.8 | 100.1 | 99.3 | 98.6 | 97.9 | 97.2 | 96.4 | 95.7 | 94.9 | 94.2 | 93.4 | 92.7 | 91.9 | 91.1 | 45 | |
| | 44 | 101.3 | 100.5 | 99.8 | 99.1 | 98.4 | 97.6 | 96.9 | 96.1 | 95.4 | 94.6 | 93.9 | 93.1 | 92.3 | 91.5 | 90.7 | 44 | |
| | 43 | 101.1 | 100.3 | 99.6 | 98.8 | 98.1 | 97.4 | 96.6 | 95.8 | 95.1 | 94.3 | 93.5 | 92.7 | 91.9 | 91.1 | 90.3 | 43 | |
| | 42 | 100.9 | 100.1 | 99.4 | 98.6 | 97.9 | 97.1 | 96.3 | 95.5 | 94.8 | 94.0 | 93.2 | 92.4 | 91.6 | 90.8 | 90.0 | 42 | |
| | 41 | 100.7 | 99.9 | 99.1 | 98.4 | 97.6 | 96.8 | 96.0 | 95.2 | 94.4 | 93.6 | 92.8 | 92.0 | 91.2 | 90.4 | 89.6 | 41 | |
| | 49 | 101.4 | 100.8 | 100.1 | 99.5 | 98.8 | 98.1 | 97.5 | 96.8 | 96.1 | 95.4 | 94.7 | 94.0 | 93.3 | 92.6 | 91.9 | 49 | |
| | 48 | 101.3 | 100.6 | 99.9 | 99.3 | 98.6 | 97.9 | 97.2 | 96.5 | 95.8 | 95.1 | 94.4 | 93.7 | 93.0 | 92.3 | 91.5 | 48 | |
| | 47 | 101.1 | 100.4 | 99.7 | 99.0 | 98.3 | 97.7 | 96.9 | 96.2 | 95.5 | 94.8 | 94.1 | 93.4 | 92.6 | 91.9 | 91.1 | 47 | |
| 7-00 | 46 | 100.9 | 100.2 | 99.5 | 98.8 | 98.1 | 97.4 | 96.7 | 96.0 | 95.2 | 94.5 | 93.8 | 93.0 | 92.3 | 91.5 | 90.8 | 46 | 5-00 |
| | 45 | 100.7 | 100.0 | 99.3 | 98.6 | 97.9 | 97.2 | 96.4 | 95.7 | 95.0 | 94.2 | 93.5 | 92.7 | 92.0 | 91.2 | 90.4 | 45 | |
| | 44 | 100.6 | 99.8 | 99.1 | 98.4 | 97.6 | 96.9 | 96.2 | 95.4 | 94.7 | 93.9 | 93.1 | 92.4 | 91.6 | 90.8 | 90.0 | 44 | |
| | 43 | 100.4 | 99.6 | 98.9 | 98.1 | 97.4 | 96.7 | 95.9 | 95.1 | 94.4 | 93.6 | 92.8 | 92.0 | 91.3 | 90.5 | 89.7 | 43 | |
| | 42 | 100.2 | 99.4 | 98.7 | 97.9 | 97.2 | 96.4 | 95.6 | 94.9 | 94.1 | 93.3 | 92.5 | 91.7 | 90.9 | 90.1 | 89.3 | 42 | |
| | 41 | 100.0 | 99.2 | 98.5 | 97.7 | 96.9 | 96.1 | 95.4 | 94.6 | 93.8 | 93.0 | 92.2 | 91.4 | 90.6 | 89.7 | 88.9 | 41 | |
| | 49 | 100.7 | 100.0 | 99.3 | 98.7 | 98.0 | 97.3 | 96.7 | 96.0 | 95.3 | 94.6 | 93.9 | 93.3 | 92.5 | 91.8 | 91.1 | 49 | |
| | 48 | 100.5 | 99.8 | 99.2 | 98.5 | 97.8 | 97.1 | 96.4 | 95.8 | 95.1 | 94.3 | 93.6 | 92.9 | 92.2 | 91.5 | 90.8 | 48 | |
| | 47 | 100.3 | 99.7 | 99.0 | 98.3 | 97.6 | 96.9 | 96.2 | 95.5 | 94.8 | 94.1 | 93.3 | 92.6 | 91.9 | 91.2 | 90.4 | 47 | |
| 6-56 | 46 | 100.2 | 99.5 | 98.8 | 98.1 | 97.4 | 96.7 | 96.0 | 95.2 | 94.5 | 93.8 | 93.1 | 92.3 | 91.6 | 90.8 | 90.1 | 46 | 5-04 |
| | 45 | 100.0 | 99.3 | 98.6 | 97.9 | 97.2 | 96.4 | 95.7 | 95.0 | 94.2 | 93.5 | 92.8 | 92.0 | 91.2 | 90.5 | 89.7 | 45 | |
| | 44 | 99.8 | 99.1 | 98.4 | 97.7 | 96.9 | 96.2 | 95.4 | 94.7 | 93.9 | 93.2 | 92.4 | 91.7 | 90.9 | 90.1 | 89.3 | 44 | |
| | 43 | 99.7 | 98.9 | 98.2 | 97.4 | 96.7 | 96.0 | 95.2 | 94.4 | 93.7 | 92.9 | 92.1 | 91.4 | 90.6 | 89.8 | 89.0 | 43 | |
| | 42 | 99.5 | 98.7 | 98.0 | 97.2 | 96.5 | 95.7 | 94.9 | 94.2 | 93.4 | 92.6 | 91.8 | 91.0 | 90.2 | 89.4 | 88.6 | 42 | |
| | 41 | 99.3 | 98.5 | 97.8 | 97.0 | 96.2 | 95.5 | 94.7 | 93.9 | 93.1 | 92.3 | 91.5 | 90.7 | 89.9 | 89.1 | 88.3 | 41 | |
| | 49 | 99.9 | 99.2 | 98.6 | 97.9 | 97.3 | 96.6 | 95.9 | 95.2 | 94.6 | 93.9 | 93.2 | 92.5 | 91.8 | 91.1 | 90.4 | 49 | |
| | 48 | 99.7 | 99.1 | 98.4 | 97.7 | 97.1 | 96.4 | 95.7 | 95.0 | 94.3 | 93.6 | 92.9 | 92.2 | 91.5 | 90.8 | 90.0 | 48 | |
| | 47 | 99.6 | 98.9 | 98.2 | 97.5 | 96.8 | 96.1 | 95.4 | 94.7 | 94.0 | 93.3 | 92.6 | 91.9 | 91.2 | 90.4 | 89.7 | 47 | |
| 6-52 | 46 | 99.4 | 98.7 | 98.0 | 97.3 | 96.6 | 95.9 | 95.2 | 94.5 | 93.8 | 93.1 | 92.3 | 91.6 | 90.8 | 90.1 | 89.4 | 46 | 5-08 |
| | 45 | 99.3 | 98.6 | 97.9 | 97.1 | 96.4 | 95.7 | 95.0 | 94.2 | 93.5 | 92.8 | 92.0 | 91.3 | 90.5 | 89.8 | 89.0 | 45 | |
| | 44 | 99.1 | 98.4 | 97.7 | 96.9 | 96.2 | 95.5 | 94.7 | 94.0 | 93.2 | 92.5 | 91.7 | 91.0 | 90.2 | 89.4 | 88.6 | 44 | |
| | 43 | 99.0 | 98.2 | 97.5 | 96.7 | 96.0 | 95.3 | 94.5 | 93.7 | 93.0 | 92.2 | 91.4 | 90.7 | 89.9 | 89.1 | 88.3 | 43 | |
| | 42 | 98.8 | 98.0 | 97.3 | 96.5 | 95.8 | 95.0 | 94.3 | 93.5 | 92.7 | 91.9 | 91.1 | 90.4 | 89.6 | 88.8 | 88.0 | 42 | |
| | 41 | 98.6 | 97.9 | 97.1 | 96.3 | 95.6 | 94.8 | 94.0 | 93.2 | 92.4 | 91.6 | 90.9 | 90.1 | 89.3 | 88.4 | 87.6 | 41 | |
| | 49 | 99.1 | 98.5 | 97.8 | 97.2 | 96.5 | 95.8 | 95.1 | 94.5 | 93.8 | 93.1 | 92.4 | 91.7 | 91.0 | 90.3 | 89.6 | 49 | |
| | 48 | 99.0 | 98.3 | 97.6 | 97.0 | 96.3 | 95.6 | 94.9 | 94.2 | 93.5 | 92.8 | 92.1 | 91.4 | 90.7 | 90.0 | 89.3 | 48 | |
| | 47 | 98.8 | 98.2 | 97.5 | 96.8 | 96.1 | 95.4 | 94.7 | 94.0 | 93.3 | 92.6 | 91.9 | 91.1 | 90.4 | 89.7 | 89.0 | 47 | |
| 6-48 | 46 | 98.7 | 98.0 | 97.3 | 96.6 | 95.9 | 95.2 | 94.5 | 93.8 | 93.1 | 92.3 | 91.6 | 90.9 | 90.1 | 89.4 | 88.6 | 46 | 5-12 |
| | 45 | 98.5 | 97.8 | 97.1 | 96.4 | 95.7 | 95.0 | 94.2 | 93.5 | 92.8 | 92.1 | 91.3 | 90.6 | 89.8 | 89.1 | 88.3 | 45 | |
| | 44 | 98.4 | 97.7 | 97.0 | 96.2 | 95.5 | 94.8 | 94.0 | 93.3 | 92.5 | 91.8 | 91.0 | 90.3 | 89.5 | 88.7 | 88.0 | 44 | |
| | 43 | 98.3 | 97.5 | 96.8 | 96.0 | 95.3 | 94.6 | 93.8 | 93.0 | 92.3 | 91.5 | 90.8 | 90.0 | 89.2 | 88.4 | 87.6 | 43 | |
| | 42 | 98.1 | 97.4 | 96.6 | 95.9 | 95.1 | 94.3 | 93.6 | 92.8 | 92.0 | 91.3 | 90.5 | 89.7 | 88.9 | 88.1 | 87.3 | 42 | |
| | 41 | 97.9 | 97.2 | 96.4 | 95.7 | 94.9 | 94.1 | 93.4 | 92.6 | 91.8 | 91.0 | 90.2 | 89.4 | 88.6 | 87.8 | 87.0 | 41 | |
| | 49 | 98.4 | 97.7 | 97.0 | 96.4 | 95.7 | 95.0 | 94.4 | 93.7 | 93.0 | 92.3 | 91.7 | 91.0 | 90.3 | 89.6 | 88.9 | 49 | |
| | 48 | 98.2 | 97.6 | 96.9 | 96.2 | 95.5 | 94.9 | 94.2 | 93.5 | 92.8 | 92.1 | 91.4 | 90.7 | 90.0 | 89.3 | 88.5 | 48 | |
| | 47 | 98.1 | 97.4 | 96.7 | 96.0 | 95.4 | 94.7 | 94.0 | 93.3 | 92.6 | 91.8 | 91.1 | 90.4 | 89.7 | 89.0 | 88.2 | 47 | |
| 6-44 | 46 | 98.0 | 97.3 | 96.6 | 95.8 | 95.2 | 94.5 | 93.8 | 93.0 | 92.3 | 91.6 | 90.9 | 90.1 | 89.4 | 88.7 | 87.9 | 46 | 5-16 |
| | 45 | 97.8 | 97.1 | 96.4 | 95.7 | 95.0 | 94.3 | 93.5 | 92.8 | 92.1 | 91.3 | 90.6 | 89.9 | 89.1 | 88.4 | 87.6 | 45 | |
| | 44 | 97.7 | 97.0 | 96.3 | 95.5 | 94.8 | 94.1 | 93.3 | 92.6 | 91.8 | 91.1 | 90.3 | 89.6 | 88.8 | 88.0 | 87.3 | 44 | |
| | 43 | 97.6 | 96.8 | 96.1 | 95.3 | 94.6 | 93.9 | 93.1 | 92.4 | 91.6 | 90.8 | 90.1 | 89.3 | 88.5 | 87.7 | 87.0 | 43 | |
| | 42 | 97.4 | 96.7 | 95.9 | 95.2 | 94.4 | 93.7 | 92.9 | 92.1 | 91.4 | 90.6 | 89.8 | 89.0 | 88.2 | 87.4 | 86.6 | 42 | |
| | 41 | 97.3 | 96.5 | 95.8 | 95.0 | 94.2 | 93.5 | 92.7 | 91.9 | 91.1 | 90.3 | 89.5 | 88.8 | 88.0 | 87.1 | 86.3 | 41 | |
| | 49 | 97.6 | 96.9 | 96.3 | 95.6 | 95.0 | 94.3 | 93.6 | 92.9 | 92.3 | 91.6 | 90.9 | 90.2 | 89.5 | 88.8 | 88.1 | 49 | |
| | 48 | 97.5 | 96.8 | 96.1 | 95.5 | 94.8 | 94.1 | 93.4 | 92.7 | 92.0 | 91.4 | 90.7 | 89.9 | 89.2 | 88.5 | 87.8 | 48 | |
| | 47 | 97.3 | 96.7 | 96.0 | 95.3 | 94.6 | 93.9 | 93.2 | 92.5 | 91.8 | 91.1 | 90.4 | 89.7 | 89.0 | 88.2 | 87.5 | 47 | |
| 6-40 | 46 | 97.2 | 96.5 | 95.8 | 95.1 | 94.4 | 93.7 | 93.0 | 92.3 | 91.6 | 90.9 | 90.1 | 89.4 | 88.7 | 87.9 | 87.2 | 46 | 5-20 |
| | 45 | 97.1 | 96.4 | 95.7 | 95.0 | 94.3 | 93.5 | 92.8 | 92.1 | 91.4 | 90.6 | 89.9 | 89.2 | 88.4 | 87.7 | 86.9 | 45 | |
| | 44 | 97.0 | 96.3 | 95.6 | 94.8 | 94.1 | 93.4 | 92.6 | 91.9 | 91.1 | 90.4 | 89.6 | 88.9 | 88.1 | 87.4 | 86.6 | 44 | |
| | 43 | 96.9 | 96.1 | 95.4 | 94.7 | 93.9 | 93.2 | 92.4 | 91.7 | 90.9 | 90.2 | 89.4 | 88.6 | 87.9 | 87.1 | 86.3 | 43 | |
| | 42 | 96.7 | 96.0 | 95.2 | 94.5 | 93.7 | 93.0 | 92.2 | 91.5 | 90.7 | 89.9 | 89.1 | 88.4 | 87.6 | 86.8 | 86.0 | 42 | |
| | 41 | 96.6 | 95.9 | 95.1 | 94.3 | 93.6 | 92.8 | 92.0 | 91.2 | 90.5 | 89.7 | 88.9 | 88.1 | 87.3 | 86.5 | 85.7 | 41 | |
| | 49 | 96.8 | 96.2 | 95.5 | 94.9 | 94.2 | 93.5 | 92.9 | 92.2 | 91.5 | 90.8 | 90.1 | 89.5 | 88.8 | 88.1 | 87.4 | 49 | |
| | 48 | 96.7 | 96.1 | 95.4 | 94.7 | 94.0 | 93.4 | 92.7 | 92.0 | 91.3 | 90.6 | 89.9 | 89.2 | 88.5 | 87.8 | 87.1 | 48 | |
| | 47 | 96.6 | 95.9 | 95.2 | 94.6 | 93.9 | 93.2 | 92.5 | 91.8 | 91.1 | 90.4 | 89.7 | 88.9 | 88.2 | 87.5 | 86.8 | 47 | |
| 6-36 | 46 | 96.5 | 95.8 | 95.1 | 94.4 | 93.7 | 93.0 | 92.3 | 91.6 | 90.9 | 90.2 | 89.4 | 88.7 | 88.0 | 87.2 | 86.5 | 46 | 5-24 |
| | 45 | 96.4 | 95.7 | 95.0 | 94.3 | 93.6 | 92.8 | 92.1 | 91.4 | 90.7 | 89.9 | 89.2 | 88.5 | 87.7 | 87.0 | 86.2 | 45 | |
| | 44 | 96.3 | 95.6 | 94.9 | 94.1 | 93.4 | 92.7 | 91.9 | 91.2 | 90.4 | 89.7 | 89.0 | 88.2 | 87.4 | 86.7 | 85.9 | 44 | |
| | 43 | 96.2 | 95.4 | 94.7 | 94.0 | 93.2 | 92.5 | 91.7 | 91.0 | 90.2 | 89.5 | 88.7 | 87.9 | 87.2 | 86.4 | 85.6 | 43 | |
| | 42 | 96.1 | 95.3 | 94.6 | 93.8 | 93.1 | 92.3 | 91.6 | 90.8 | 90.0 | 89.2 | 88.5 | 87.7 | 86.9 | 86.1 | 85.3 | 42 | |
| | 41 | 95.9 | 95.2 | 94.4 | 93.7 | 92.9 | 92.1 | 91.4 | 90.6 | 89.8 | 89.0 | 88.2 | 87.5 | 86.7 | 85.9 | 85.1 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

7 hrs. 8 m. to 6 hrs. 36 m. 4 hr. 52 m. to 5 hrs. 24 m.

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 92.7 | 92.0 | 91.2 | 90.4 | 89.7 | 88.9 | 88.1 | 87.3 | 86.6 | 85.7 | 84.9 | 84.1 | 83.2 | 82.4 | 81.5 | 49 | |
| | 48 | 92.3 | 91.5 | 90.8 | 90.0 | 89.2 | 88.4 | 87.6 | 86.8 | 86.0 | 85.2 | 84.3 | 83.5 | 82.6 | 81.8 | 80.9 | 48 | |
| | 47 | 91.9 | 91.1 | 90.3 | 89.5 | 88.7 | 87.9 | 87.1 | 86.3 | 85.5 | 84.6 | 83.8 | 82.9 | 82.0 | 81.2 | 80.3 | 47 | |
| | 46 | 91.5 | 90.7 | 89.9 | 89.1 | 88.3 | 87.5 | 86.6 | 85.8 | 85.0 | 84.1 | 83.2 | 82.3 | 81.5 | 80.6 | 79.6 | 46 | |
| 7-08 | 45 | 91.0 | 90.2 | 89.4 | 88.6 | 87.8 | 87.0 | 86.1 | 85.3 | 84.4 | 83.6 | 82.7 | 81.8 | 80.9 | 80.0 | 79.0 | 45 | 4-52 |
| | 44 | 90.6 | 89.8 | 89.0 | 88.2 | 87.3 | 86.5 | 85.6 | 84.8 | 83.9 | 83.0 | 82.1 | 81.2 | 80.3 | 79.4 | 78.4 | 44 | |
| | 43 | 90.2 | 89.4 | 88.6 | 87.7 | 86.9 | 86.0 | 85.1 | 84.3 | 83.4 | 82.5 | 81.6 | 80.7 | 79.7 | 78.8 | 77.8 | 43 | |
| | 42 | 89.8 | 89.0 | 88.1 | 87.3 | 86.4 | 85.5 | 84.7 | 83.8 | 82.9 | 82.0 | 81.0 | 80.1 | 79.2 | 78.2 | 77.3 | 42 | |
| | 41 | 89.4 | 88.5 | 87.7 | 86.8 | 85.9 | 85.1 | 84.2 | 83.3 | 82.4 | 81.4 | 80.5 | 79.6 | 78.6 | 77.6 | 76.7 | 41 | |
| | 49 | 91.9 | 91.2 | 90.4 | 89.7 | 88.9 | 88.2 | 87.4 | 86.6 | 85.8 | 85.0 | 84.2 | 83.4 | 82.5 | 81.7 | 80.8 | 49 | |
| | 48 | 91.5 | 90.8 | 90.0 | 89.3 | 88.5 | 87.7 | 86.9 | 86.1 | 85.3 | 84.5 | 83.6 | 82.8 | 81.9 | 81.1 | 80.2 | 48 | |
| | 47 | 91.1 | 90.4 | 89.6 | 88.8 | 88.0 | 87.2 | 86.4 | 85.6 | 84.8 | 83.9 | 83.1 | 82.2 | 81.4 | 80.5 | 79.6 | 47 | |
| | 46 | 90.8 | 90.0 | 89.2 | 88.4 | 87.6 | 86.8 | 85.9 | 85.1 | 84.3 | 83.4 | 82.6 | 81.7 | 80.8 | 79.9 | 79.0 | 46 | |
| 7-04 | 45 | 90.3 | 89.5 | 88.7 | 87.9 | 87.1 | 86.3 | 85.5 | 84.6 | 83.8 | 82.9 | 82.0 | 81.1 | 80.2 | 79.3 | 78.4 | 45 | 4-56 |
| | 44 | 89.9 | 89.1 | 88.3 | 87.5 | 86.7 | 85.8 | 85.0 | 84.1 | 83.3 | 82.4 | 81.5 | 80.6 | 79.7 | 78.8 | 77.8 | 44 | |
| | 43 | 89.5 | 88.7 | 87.9 | 87.1 | 86.2 | 85.4 | 84.5 | 83.6 | 82.7 | 81.9 | 81.0 | 80.0 | 79.1 | 78.2 | 77.3 | 43 | |
| | 42 | 89.1 | 88.3 | 87.5 | 86.6 | 85.8 | 84.9 | 84.0 | 83.1 | 82.3 | 81.3 | 80.4 | 79.5 | 78.6 | 77.6 | 76.7 | 42 | |
| | 41 | 88.7 | 87.9 | 87.0 | 86.2 | 85.3 | 84.4 | 83.6 | 82.7 | 81.8 | 80.8 | 79.9 | 79.0 | 78.0 | 77.1 | 76.1 | 41 | |
| | 49 | 91.2 | 90.4 | 89.7 | 88.9 | 88.2 | 87.4 | 86.7 | 85.9 | 85.1 | 84.3 | 83.5 | 82.6 | 81.8 | 81.0 | 80.1 | 49 | |
| | 48 | 90.8 | 90.0 | 89.3 | 88.5 | 87.7 | 87.0 | 86.2 | 85.4 | 84.6 | 83.8 | 82.9 | 82.1 | 81.3 | 80.4 | 79.5 | 48 | |
| | 47 | 90.4 | 89.6 | 88.9 | 88.1 | 87.3 | 86.5 | 85.7 | 84.9 | 84.1 | 83.2 | 82.4 | 81.6 | 80.7 | 79.8 | 78.9 | 47 | |
| | 46 | 90.0 | 89.2 | 88.5 | 87.7 | 86.9 | 86.1 | 85.2 | 84.4 | 83.6 | 82.7 | 81.9 | 81.0 | 80.1 | 79.3 | 78.4 | 46 | |
| 7-00 | 45 | 89.6 | 88.8 | 88.0 | 87.2 | 86.4 | 85.6 | 84.8 | 83.9 | 83.1 | 82.2 | 81.4 | 80.5 | 79.6 | 78.7 | 77.8 | 45 | 5-00 |
| | 44 | 89.2 | 88.4 | 87.6 | 86.8 | 86.0 | 85.2 | 84.3 | 83.5 | 82.6 | 81.7 | 80.8 | 80.0 | 79.1 | 78.1 | 77.2 | 44 | |
| | 43 | 88.9 | 88.0 | 87.2 | 86.4 | 85.6 | 84.7 | 83.8 | 83.0 | 82.1 | 81.2 | 80.3 | 79.4 | 78.5 | 77.6 | 76.7 | 43 | |
| | 42 | 88.5 | 87.6 | 86.8 | 86.0 | 85.1 | 84.3 | 83.4 | 82.5 | 81.6 | 80.7 | 79.8 | 78.9 | 78.0 | 77.1 | 76.1 | 42 | |
| | 41 | 88.1 | 87.2 | 86.4 | 85.5 | 84.7 | 83.8 | 82.9 | 82.0 | 81.1 | 80.2 | 79.3 | 78.4 | 77.5 | 76.5 | 75.6 | 41 | |
| | 49 | 90.4 | 89.7 | 88.9 | 88.2 | 87.4 | 86.7 | 85.9 | 85.1 | 84.4 | 83.6 | 82.8 | 81.9 | 81.1 | 80.3 | 79.4 | 49 | |
| | 48 | 90.0 | 89.3 | 88.5 | 87.8 | 87.0 | 86.2 | 85.5 | 84.7 | 83.9 | 83.1 | 82.2 | 81.4 | 80.6 | 79.7 | 78.9 | 48 | |
| | 47 | 89.7 | 88.9 | 88.1 | 87.4 | 86.6 | 85.8 | 85.0 | 84.2 | 83.4 | 82.6 | 81.7 | 80.9 | 80.0 | 79.2 | 78.3 | 47 | |
| | 46 | 89.3 | 88.5 | 87.7 | 87.0 | 86.2 | 85.4 | 84.5 | 83.7 | 82.9 | 82.1 | 81.2 | 80.4 | 79.5 | 78.6 | 77.7 | 46 | |
| 6-56 | 45 | 88.9 | 88.1 | 87.3 | 86.5 | 85.7 | 84.9 | 84.1 | 83.3 | 82.4 | 81.6 | 80.7 | 79.8 | 79.0 | 78.1 | 77.2 | 45 | 5-04 |
| | 44 | 88.5 | 87.7 | 86.9 | 86.1 | 85.3 | 84.5 | 83.6 | 82.8 | 82.0 | 81.1 | 80.2 | 79.3 | 78.4 | 77.5 | 76.6 | 44 | |
| | 43 | 88.2 | 87.4 | 86.5 | 85.7 | 84.9 | 84.1 | 83.2 | 82.3 | 81.5 | 80.6 | 79.7 | 78.8 | 77.9 | 77.0 | 76.1 | 43 | |
| | 42 | 87.8 | 87.0 | 86.2 | 85.3 | 84.5 | 83.6 | 82.8 | 81.9 | 81.0 | 80.1 | 79.2 | 78.3 | 77.4 | 76.5 | 75.6 | 42 | |
| | 41 | 87.4 | 86.6 | 85.8 | 84.9 | 84.0 | 83.2 | 82.3 | 81.4 | 80.5 | 79.6 | 78.7 | 77.8 | 76.9 | 76.0 | 75.0 | 41 | |
| | 49 | 89.7 | 88.9 | 88.2 | 87.4 | 86.7 | 86.0 | 85.2 | 84.4 | 83.6 | 82.8 | 82.0 | 81.2 | 80.4 | 79.6 | 78.7 | 49 | |
| | 48 | 89.3 | 88.6 | 87.8 | 87.0 | 86.3 | 85.5 | 84.8 | 84.0 | 83.2 | 82.4 | 81.5 | 80.7 | 79.9 | 79.1 | 78.2 | 48 | |
| | 47 | 88.9 | 88.2 | 87.4 | 86.7 | 85.9 | 85.1 | 84.3 | 83.5 | 82.7 | 81.9 | 81.0 | 80.2 | 79.4 | 78.5 | 77.6 | 47 | |
| | 46 | 88.6 | 87.8 | 87.0 | 86.3 | 85.5 | 84.7 | 83.9 | 83.0 | 82.3 | 81.4 | 80.6 | 79.7 | 78.8 | 78.0 | 77.1 | 46 | |
| 6-52 | 45 | 88.2 | 87.4 | 86.6 | 85.9 | 85.1 | 84.2 | 83.4 | 82.6 | 81.8 | 80.9 | 80.1 | 79.2 | 78.3 | 77.4 | 76.6 | 45 | 5-08 |
| | 44 | 87.9 | 87.1 | 86.3 | 85.5 | 84.7 | 83.8 | 83.0 | 82.2 | 81.3 | 80.4 | 79.6 | 78.7 | 77.8 | 76.9 | 76.0 | 44 | |
| | 43 | 87.5 | 86.7 | 85.9 | 85.1 | 84.2 | 83.4 | 82.6 | 81.7 | 80.8 | 80.0 | 79.1 | 78.2 | 77.3 | 76.4 | 75.5 | 43 | |
| | 42 | 87.1 | 86.3 | 85.5 | 84.7 | 83.8 | 83.0 | 82.1 | 81.3 | 80.4 | 79.5 | 78.6 | 77.7 | 76.8 | 75.9 | 75.0 | 42 | |
| | 41 | 86.8 | 86.0 | 85.1 | 84.3 | 83.4 | 82.6 | 81.7 | 80.8 | 79.9 | 79.1 | 78.2 | 77.2 | 76.3 | 75.4 | 74.5 | 41 | |
| | 49 | 88.9 | 88.2 | 87.4 | 86.7 | 86.0 | 85.2 | 84.5 | 83.7 | 82.9 | 82.1 | 81.3 | 80.5 | 79.7 | 78.9 | 78.1 | 49 | |
| | 48 | 88.6 | 87.8 | 87.1 | 86.3 | 85.6 | 84.8 | 84.0 | 83.3 | 82.5 | 81.7 | 80.9 | 80.0 | 79.2 | 78.4 | 77.5 | 48 | |
| | 47 | 88.2 | 87.5 | 86.7 | 85.9 | 85.2 | 84.4 | 83.6 | 82.8 | 82.0 | 81.2 | 80.4 | 79.5 | 78.7 | 77.9 | 77.0 | 47 | |
| | 46 | 87.9 | 87.1 | 86.3 | 85.6 | 84.8 | 84.0 | 83.2 | 82.4 | 81.6 | 80.7 | 79.9 | 79.1 | 78.2 | 77.3 | 76.5 | 46 | |
| 6-48 | 45 | 87.5 | 86.7 | 86.0 | 85.2 | 84.4 | 83.6 | 82.8 | 81.9 | 81.1 | 80.3 | 79.4 | 78.6 | 77.7 | 76.8 | 75.9 | 45 | 5-12 |
| | 44 | 87.2 | 86.4 | 85.6 | 84.8 | 84.0 | 83.2 | 82.3 | 81.5 | 80.7 | 79.8 | 79.0 | 78.1 | 77.2 | 76.3 | 75.4 | 44 | |
| | 43 | 86.8 | 86.0 | 85.2 | 84.4 | 83.6 | 82.8 | 81.9 | 81.1 | 80.2 | 79.4 | 78.5 | 77.6 | 76.7 | 75.8 | 74.9 | 43 | |
| | 42 | 86.5 | 85.7 | 84.9 | 84.0 | 83.2 | 82.4 | 81.5 | 80.7 | 79.8 | 78.9 | 78.0 | 77.1 | 76.2 | 75.3 | 74.4 | 42 | |
| | 41 | 86.2 | 85.3 | 84.5 | 83.7 | 82.8 | 82.0 | 81.1 | 80.2 | 79.4 | 78.5 | 77.6 | 76.7 | 75.8 | 74.8 | 73.9 | 41 | |
| | 49 | 88.2 | 87.4 | 86.7 | 86.0 | 85.2 | 84.5 | 83.7 | 83.0 | 82.2 | 81.4 | 80.6 | 79.8 | 79.0 | 78.2 | 77.4 | 49 | |
| | 48 | 87.8 | 87.1 | 86.3 | 85.6 | 84.8 | 84.1 | 83.3 | 82.5 | 81.8 | 81.0 | 80.2 | 79.4 | 78.5 | 77.7 | 76.9 | 48 | |
| | 47 | 87.5 | 86.7 | 86.0 | 85.2 | 84.5 | 83.7 | 82.9 | 82.1 | 81.3 | 80.5 | 79.7 | 78.9 | 78.0 | 77.2 | 76.3 | 47 | |
| | 46 | 87.2 | 86.4 | 85.6 | 84.9 | 84.1 | 83.3 | 82.5 | 81.7 | 80.9 | 80.1 | 79.2 | 78.4 | 77.6 | 76.7 | 75.8 | 46 | |
| 6-44 | 45 | 86.8 | 86.1 | 85.3 | 84.5 | 83.7 | 82.9 | 82.1 | 81.3 | 80.4 | 79.6 | 78.8 | 77.9 | 77.1 | 76.2 | 75.3 | 45 | 5-16 |
| | 44 | 86.5 | 85.7 | 84.9 | 84.1 | 83.3 | 82.5 | 81.7 | 80.9 | 80.0 | 79.2 | 78.3 | 77.5 | 76.6 | 75.9 | 74.8 | 44 | |
| | 43 | 86.2 | 85.4 | 84.6 | 83.8 | 82.9 | 82.1 | 81.3 | 80.4 | 79.6 | 78.7 | 77.9 | 77.0 | 76.1 | 75.2 | 74.3 | 43 | |
| | 42 | 85.8 | 85.0 | 84.2 | 83.4 | 82.6 | 81.7 | 80.9 | 80.0 | 79.2 | 78.3 | 77.4 | 76.5 | 75.7 | 74.8 | 73.9 | 42 | |
| | 41 | 85.5 | 84.7 | 83.9 | 83.0 | 82.2 | 81.3 | 80.5 | 79.6 | 78.8 | 77.9 | 77.0 | 76.1 | 75.2 | 74.3 | 73.4 | 41 | |
| | 49 | 87.4 | 86.7 | 86.0 | 85.2 | 84.5 | 83.8 | 83.0 | 82.3 | 81.5 | 80.7 | 79.9 | 79.1 | 78.3 | 77.5 | 76.7 | 49 | |
| | 48 | 87.1 | 86.4 | 85.6 | 84.9 | 84.1 | 83.4 | 82.6 | 81.8 | 81.1 | 80.3 | 79.5 | 78.7 | 77.9 | 77.0 | 76.2 | 48 | |
| | 47 | 86.8 | 86.0 | 85.3 | 84.5 | 83.8 | 83.0 | 82.2 | 81.4 | 80.6 | 79.8 | 79.0 | 78.2 | 77.4 | 76.5 | 75.7 | 47 | |
| | 46 | 86.4 | 85.7 | 84.9 | 84.2 | 83.4 | 82.6 | 81.8 | 81.0 | 80.2 | 79.4 | 78.6 | 77.7 | 76.9 | 76.1 | 75.2 | 46 | |
| 6-40 | 45 | 86.1 | 85.4 | 84.6 | 83.8 | 83.0 | 82.2 | 81.4 | 80.6 | 79.8 | 79.0 | 78.1 | 77.3 | 76.4 | 75.6 | 74.7 | 45 | 5-20 |
| | 44 | 85.8 | 85.0 | 84.2 | 83.5 | 82.7 | 81.8 | 81.0 | 80.2 | 79.4 | 78.5 | 77.7 | 76.8 | 76.0 | 75.1 | 74.2 | 44 | |
| | 43 | 85.5 | 84.7 | 83.9 | 83.1 | 82.3 | 81.5 | 80.6 | 79.8 | 79.0 | 78.1 | 77.3 | 76.4 | 75.5 | 74.6 | 73.8 | 43 | |
| | 42 | 85.2 | 84.4 | 83.6 | 82.8 | 81.9 | 81.1 | 80.3 | 79.4 | 78.6 | 77.7 | 76.8 | 76.0 | 75.1 | 74.2 | 73.3 | 42 | |
| | 41 | 84.9 | 84.1 | 83.2 | 82.4 | 81.6 | 80.7 | 79.9 | 79.0 | 78.2 | 77.3 | 76.4 | 75.5 | 74.6 | 73.7 | 72.8 | 41 | |
| | 49 | 86.7 | 85.9 | 85.2 | 84.5 | 83.8 | 83.0 | 82.3 | 81.5 | 80.8 | 80.0 | 79.2 | 78.4 | 77.7 | 76.8 | 76.0 | 49 | |
| | 48 | 86.4 | 85.6 | 84.9 | 84.2 | 83.4 | 82.7 | 81.9 | 81.1 | 80.4 | 79.6 | 78.8 | 78.0 | 77.2 | 76.4 | 75.5 | 48 | |
| | 47 | 86.1 | 85.3 | 84.6 | 83.8 | 83.1 | 82.3 | 81.5 | 80.7 | 80.0 | 79.2 | 78.4 | 77.5 | 76.7 | 75.9 | 75.1 | 47 | |
| | 46 | 85.7 | 85.0 | 84.2 | 83.5 | 82.7 | 81.9 | 81.1 | 80.3 | 79.6 | 78.7 | 77.9 | 77.1 | 76.3 | 75.4 | 74.6 | 46 | |
| 6-36 | 45 | 85.4 | 84.7 | 83.9 | 83.1 | 82.3 | 81.6 | 80.8 | 79.9 | 79.1 | 78.3 | 77.5 | 76.7 | 75.8 | 75.0 | 74.1 | 45 | 5-24 |
| | 44 | 85.1 | 84.4 | 83.6 | 82.8 | 82.0 | 81.2 | 80.4 | 79.6 | 78.7 | 77.9 | 77.1 | 76.2 | 75.4 | 74.5 | 73.6 | 44 | |
| | 43 | 84.8 | 84.1 | 83.3 | 82.5 | 81.7 | 80.8 | 80.0 | 79.2 | 78.4 | 77.5 | 76.7 | 75.8 | 74.9 | 74.1 | 73.2 | 43 | |
| | 42 | 84.5 | 83.7 | 82.9 | 82.1 | 81.3 | 80.5 | 79.6 | 78.8 | 77.9 | 77.1 | 76.2 | 75.4 | 74.5 | 73.6 | 72.7 | 42 | |
| | 41 | 84.2 | 83.4 | 82.6 | 81.8 | 81.0 | 80.1 | 79.3 | 78.4 | 77.6 | 76.7 | 75.8 | 75.0 | 74.1 | 73.2 | 72.3 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 96.8 | 96.2 | 95.5 | 94.9 | 94.2 | 93.5 | 92.9 | 92.2 | 91.5 | 90.8 | 90.1 | 89.5 | 88.8 | 88.1 | 87.4 | 49 | |
| | 48 | 96.7 | 96.1 | 95.4 | 94.7 | 94.0 | 93.4 | 92.7 | 92.0 | 91.3 | 90.6 | 89.9 | 89.2 | 88.5 | 87.8 | 87.1 | 48 | |
| | 47 | 96.6 | 95.9 | 95.2 | 94.6 | 93.9 | 93.2 | 92.5 | 91.8 | 91.1 | 90.4 | 89.7 | 88.9 | 88.2 | 87.5 | 86.8 | 47 | |
| 6-36 | 46 | 96.5 | 95.8 | 95.1 | 94.4 | 93.7 | 93.0 | 92.3 | 91.6 | 90.9 | 90.2 | 89.4 | 88.7 | 88.0 | 87.2 | 86.5 | 46 | 5 -24 |
| | 45 | 96.4 | 95.7 | 95.0 | 94.3 | 93.6 | 92.8 | 92.1 | 91.4 | 90.7 | 89.9 | 89.2 | 88.5 | 87.7 | 87.0 | 86.2 | 45 | |
| | 44 | 96.3 | 95.6 | 94.9 | 94.1 | 93.4 | 92.7 | 91.9 | 91.2 | 90.4 | 89.7 | 89.0 | 88.2 | 87.4 | 86.7 | 85.9 | 44 | |
| | 43 | 96.2 | 95.4 | 94.7 | 94.0 | 93.2 | 92.5 | 91.7 | 91.0 | 90.2 | 89.5 | 88.7 | 87.9 | 87.2 | 86.4 | 85.6 | 43 | |
| | 42 | 96.1 | 95.3 | 94.6 | 93.8 | 93.1 | 92.3 | 91.6 | 90.8 | 90.0 | 89.2 | 88.5 | 87.7 | 86.9 | 86.1 | 85.3 | 42 | |
| | 41 | 95.9 | 95.2 | 94.4 | 93.7 | 92.9 | 92.1 | 91.4 | 90.6 | 89.8 | 89.0 | 88.2 | 87.5 | 86.7 | 85.9 | 85.1 | 41 | |
| | 49 | 96.1 | 95.4 | 94.7 | 94.1 | 93.4 | 92.8 | 92.1 | 91.4 | 90.7 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.6 | 49 | |
| | 48 | 96.0 | 95.3 | 94.6 | 94.0 | 93.3 | 92.6 | 91.9 | 91.2 | 90.5 | 89.8 | 89.2 | 88.5 | 87.8 | 87.1 | 86.3 | 48 | |
| | 47 | 95.9 | 95.2 | 94.5 | 93.8 | 93.1 | 92.4 | 91.8 | 91.1 | 90.4 | 89.6 | 88.9 | 88.2 | 87.5 | 86.8 | 86.1 | 47 | |
| 6-32 | 46 | 95.8 | 95.1 | 94.4 | 93.7 | 93.0 | 92.3 | 91.6 | 90.9 | 90.2 | 89.4 | 88.7 | 88.0 | 87.3 | 86.5 | 85.8 | 46 | 5 -28 |
| | 45 | 95.7 | 95.0 | 94.3 | 93.6 | 92.8 | 92.1 | 91.4 | 90.7 | 90.0 | 89.2 | 88.5 | 87.8 | 87.0 | 86.3 | 85.5 | 45 | |
| | 44 | 95.6 | 94.9 | 94.2 | 93.4 | 92.7 | 92.0 | 91.2 | 90.5 | 89.7 | 89.0 | 88.3 | 87.5 | 86.8 | 86.0 | 85.2 | 44 | |
| | 43 | 95.5 | 94.7 | 94.0 | 93.3 | 92.5 | 91.8 | 91.1 | 90.3 | 89.6 | 88.8 | 88.0 | 87.3 | 86.5 | 85.7 | 85.0 | 43 | |
| | 42 | 95.4 | 94.6 | 93.9 | 93.1 | 92.4 | 91.6 | 90.9 | 90.1 | 89.3 | 88.6 | 87.8 | 87.0 | 86.3 | 85.5 | 84.7 | 42 | |
| | 41 | 95.3 | 94.5 | 93.8 | 93.0 | 92.2 | 91.5 | 90.7 | 89.9 | 89.2 | 88.4 | 87.6 | 86.8 | 86.0 | 85.2 | 84.4 | 41 | |
| | 49 | 95.3 | 94.6 | 94.0 | 93.3 | 92.7 | 92.0 | 91.3 | 90.7 | 90.0 | 89.3 | 88.6 | 88.0 | 87.3 | 86.6 | 85.9 | 49 | |
| | 48 | 95.2 | 94.6 | 93.9 | 93.2 | 92.5 | 91.9 | 91.2 | 90.5 | 89.8 | 89.1 | 88.4 | 87.7 | 87.0 | 86.3 | 85.6 | 48 | |
| | 47 | 95.1 | 94.5 | 93.8 | 93.1 | 92.4 | 91.7 | 91.0 | 90.3 | 89.6 | 88.9 | 88.2 | 87.5 | 86.8 | 86.1 | 85.3 | 47 | |
| 6-28 | 46 | 95.0 | 94.3 | 93.6 | 92.9 | 92.2 | 91.5 | 90.8 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.5 | 85.8 | 85.1 | 46 | 5-32 |
| | 45 | 95.0 | 94.3 | 93.6 | 92.8 | 92.1 | 91.4 | 90.7 | 90.0 | 89.2 | 88.5 | 87.8 | 87.1 | 86.3 | 85.6 | 84.8 | 45 | |
| | 44 | 94.9 | 94.2 | 93.5 | 92.7 | 92.0 | 91.3 | 90.5 | 89.8 | 89.1 | 88.3 | 87.6 | 86.8 | 86.1 | 85.3 | 84.6 | 44 | |
| | 43 | 94.8 | 94.1 | 93.3 | 92.6 | 91.9 | 91.1 | 90.4 | 89.6 | 88.9 | 88.1 | 87.4 | 86.6 | 85.8 | 85.1 | 84.3 | 43 | |
| | 42 | 94.7 | 94.0 | 93.2 | 92.5 | 91.7 | 91.0 | 90.2 | 89.4 | 88.7 | 87.9 | 87.1 | 86.4 | 85.6 | 84.8 | 84.0 | 42 | |
| | 41 | 94.6 | 93.8 | 93.1 | 92.3 | 91.6 | 90.8 | 90.0 | 89.3 | 88.5 | 87.7 | 86.9 | 86.2 | 85.4 | 84.6 | 83.8 | 41 | |
| | 49 | 94.5 | 93.9 | 93.2 | 92.6 | 91.9 | 91.2 | 90.6 | 89.9 | 89.2 | 88.6 | 87.9 | 87.2 | 86.5 | 85.8 | 85.1 | 49 | |
| | 48 | 94.5 | 93.8 | 93.1 | 92.5 | 91.8 | 91.1 | 90.4 | 89.8 | 89.1 | 88.4 | 87.7 | 87.0 | 86.3 | 85.6 | 84.9 | 48 | |
| | 47 | 94.4 | 93.7 | 93.0 | 92.3 | 91.7 | 91.0 | 90.3 | 89.6 | 88.9 | 88.2 | 87.5 | 86.8 | 86.1 | 85.3 | 84.6 | 47 | |
| 6-24 | 46 | 94.3 | 93.6 | 92.9 | 92.2 | 91.5 | 90.8 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.6 | 85.8 | 85.1 | 84.4 | 46 | 5-36 |
| | 45 | 94.3 | 93.5 | 92.8 | 92.1 | 91.4 | 90.7 | 90.0 | 89.3 | 88.5 | 87.8 | 87.1 | 86.4 | 85.6 | 84.9 | 84.1 | 45 | |
| | 44 | 94.2 | 93.5 | 92.8 | 92.0 | 91.3 | 90.6 | 89.8 | 89.1 | 88.4 | 87.6 | 86.9 | 86.1 | 85.4 | 84.6 | 83.9 | 44 | |
| | 43 | 94.1 | 93.4 | 92.6 | 91.9 | 91.2 | 90.4 | 89.7 | 88.9 | 88.2 | 87.4 | 86.7 | 85.9 | 85.2 | 84.4 | 83.6 | 43 | |
| | 42 | 94.0 | 93.3 | 92.5 | 91.8 | 91.0 | 90.3 | 89.5 | 88.8 | 88.0 | 87.3 | 86.5 | 85.7 | 85.0 | 84.2 | 83.4 | 42 | |
| | 41 | 94.0 | 93.2 | 92.4 | 91.7 | 90.9 | 90.2 | 89.4 | 88.6 | 87.9 | 87.1 | 86.3 | 85.5 | 84.7 | 83.9 | 83.2 | 41 | |
| | 49 | 93.8 | 93.1 | 92.5 | 91.8 | 91.2 | 90.5 | 89.8 | 89.2 | 88.5 | 87.8 | 87.1 | 86.5 | 85.8 | 85.1 | 84.4 | 49 | |
| | 48 | 93.7 | 93.1 | 92.4 | 91.7 | 91.0 | 90.4 | 89.7 | 89.0 | 88.3 | 87.6 | 86.9 | 86.3 | 85.6 | 84.9 | 84.2 | 48 | |
| | 47 | 93.7 | 93.0 | 92.3 | 91.6 | 90.9 | 90.2 | 89.6 | 88.9 | 88.2 | 87.4 | 86.8 | 86.1 | 85.3 | 84.6 | 83.9 | 47 | |
| 6-20 | 46 | 93.6 | 92.9 | 92.2 | 91.5 | 90.8 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.6 | 85.9 | 85.1 | 84.4 | 83.7 | 46 | 5 -40 |
| | 45 | 93.5 | 92.8 | 92.1 | 91.4 | 90.7 | 90.0 | 89.3 | 88.6 | 87.8 | 87.1 | 86.4 | 85.7 | 84.9 | 84.2 | 83.4 | 45 | |
| | 44 | 93.5 | 92.8 | 92.0 | 91.3 | 90.6 | 89.9 | 89.1 | 88.4 | 87.7 | 86.9 | 86.2 | 85.5 | 84.7 | 84.0 | 83.2 | 44 | |
| | 43 | 93.4 | 92.7 | 92.0 | 91.2 | 90.5 | 89.7 | 89.0 | 88.3 | 87.5 | 86.8 | 86.0 | 85.3 | 84.5 | 83.7 | 83.0 | 43 | |
| | 42 | 93.4 | 92.6 | 91.9 | 91.1 | 90.4 | 89.6 | 88.9 | 88.1 | 87.4 | 86.6 | 85.8 | 85.1 | 84.3 | 83.5 | 82.7 | 42 | |
| | 41 | 93.3 | 92.5 | 91.8 | 91.0 | 90.3 | 89.5 | 88.7 | 88.0 | 87.2 | 86.4 | 85.6 | 84.9 | 84.1 | 83.3 | 82.5 | 41 | |
| | 49 | 93.0 | 92.4 | 91.7 | 91.1 | 90.4 | 89.7 | 89.1 | 88.4 | 87.7 | 87.1 | 86.4 | 85.7 | 85.0 | 84.3 | 83.7 | 49 | |
| | 48 | 93.0 | 92.3 | 91.6 | 91.0 | 90.2 | 89.6 | 88.9 | 88.3 | 87.6 | 86.9 | 86.2 | 85.5 | 84.8 | 84.1 | 83.4 | 48 | |
| | 47 | 92.9 | 92.3 | 91.6 | 90.9 | 90.2 | 89.5 | 88.8 | 88.1 | 87.4 | 86.7 | 86.0 | 85.3 | 84.6 | 83.9 | 83.2 | 47 | |
| 6-16 | 46 | 92.9 | 92.2 | 91.5 | 90.8 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.6 | 85.9 | 85.1 | 84.4 | 83.7 | 83.0 | 46 | 5-44 |
| | 45 | 92.8 | 92.1 | 91.4 | 90.7 | 90.0 | 89.3 | 88.6 | 87.8 | 87.1 | 86.4 | 85.7 | 85.0 | 84.2 | 83.5 | 82.8 | 45 | |
| | 44 | 92.8 | 92.1 | 91.4 | 90.6 | 89.9 | 89.2 | 88.4 | 87.7 | 87.0 | 86.3 | 85.5 | 84.8 | 84.0 | 83.3 | 82.5 | 44 | |
| | 43 | 92.7 | 92.0 | 91.3 | 90.5 | 89.8 | 89.1 | 88.3 | 87.6 | 86.8 | 86.1 | 85.3 | 84.6 | 83.8 | 83.1 | 82.3 | 43 | |
| | 42 | 92.7 | 91.9 | 91.2 | 90.4 | 89.7 | 89.0 | 88.2 | 87.4 | 86.7 | 85.9 | 85.2 | 84.4 | 83.6 | 82.9 | 82.1 | 42 | |
| | 41 | 92.6 | 91.9 | 91.1 | 90.4 | 89.6 | 88.8 | 88.1 | 87.3 | 86.5 | 85.8 | 85.0 | 84.2 | 83.5 | 82.7 | 81.9 | 41 | |
| | 49 | 92.3 | 91.6 | 91.0 | 90.3 | 89.6 | 89.0 | 88.3 | 87.6 | 87.0 | 86.3 | 85.6 | 85.0 | 84.3 | 83.6 | 82.9 | 49 | |
| | 48 | 92.2 | 91.6 | 90.9 | 90.2 | 89.5 | 88.9 | 88.2 | 87.5 | 86.8 | 86.2 | 85.5 | 84.8 | 84.1 | 83.4 | 82.7 | 48 | |
| | 47 | 92.2 | 91.5 | 90.8 | 90.1 | 89.5 | 88.8 | 88.1 | 87.4 | 86.7 | 86.0 | 85.3 | 84.6 | 83.9 | 83.2 | 82.5 | 47 | |
| 6-12 | 46 | 92.2 | 91.5 | 90.8 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.6 | 85.9 | 85.1 | 84.4 | 83.7 | 83.0 | 82.3 | 46 | 5-48 |
| | 45 | 92.1 | 91.4 | 90.7 | 90.0 | 89.3 | 88.6 | 87.9 | 87.1 | 86.4 | 85.7 | 85.0 | 84.3 | 83.5 | 82.8 | 82.1 | 45 | |
| | 44 | 92.1 | 91.4 | 90.7 | 89.9 | 89.2 | 88.5 | 87.8 | 87.0 | 86.3 | 85.6 | 84.8 | 84.1 | 83.4 | 82.6 | 81.9 | 44 | |
| | 43 | 92.1 | 91.3 | 90.6 | 89.9 | 89.1 | 88.4 | 87.6 | 86.9 | 86.2 | 85.4 | 84.7 | 83.9 | 83.2 | 82.4 | 81.7 | 43 | |
| | 42 | 92.0 | 91.3 | 90.5 | 89.8 | 89.0 | 88.3 | 87.5 | 86.8 | 86.0 | 85.3 | 84.5 | 83.8 | 83.0 | 82.2 | 81.5 | 42 | |
| | 41 | 92.0 | 91.2 | 90.5 | 89.7 | 89.0 | 88.2 | 87.4 | 86.7 | 85.9 | 85.1 | 84.4 | 83.6 | 82.8 | 82.0 | 81.3 | 41 | |
| | 49 | 91.5 | 90.9 | 90.2 | 89.5 | 88.9 | 88.2 | 87.6 | 86.9 | 86.2 | 85.6 | 84.9 | 84.2 | 83.5 | 82.9 | 82.2 | 49 | |
| | 48 | 91.5 | 90.8 | 90.2 | 89.5 | 88.8 | 88.1 | 87.5 | 86.8 | 86.1 | 85.4 | 84.7 | 84.1 | 83.4 | 82.7 | 82.0 | 48 | |
| | 47 | 91.5 | 90.8 | 90.1 | 89.4 | 88.7 | 88.0 | 87.4 | 86.7 | 86.0 | 85.3 | 84.6 | 83.9 | 83.2 | 82.5 | 81.8 | 47 | |
| 6-08 | 46 | 91.4 | 90.7 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.6 | 85.9 | 85.1 | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 46 | 5-52 |
| | 45 | 91.4 | 90.7 | 90.0 | 89.3 | 88.6 | 87.9 | 87.2 | 86.4 | 85.7 | 85.0 | 84.3 | 83.6 | 82.8 | 82.1 | 81.4 | 45 | |
| | 44 | 91.4 | 90.7 | 90.0 | 89.2 | 88.5 | 87.8 | 87.1 | 86.3 | 85.6 | 84.9 | 84.1 | 83.4 | 82.7 | 81.9 | 81.2 | 44 | |
| | 43 | 91.4 | 90.6 | 89.9 | 89.2 | 88.4 | 87.7 | 87.0 | 86.2 | 85.5 | 84.7 | 84.0 | 83.3 | 82.5 | 81.7 | 81.0 | 43 | |
| | 42 | 91.3 | 90.6 | 89.9 | 89.1 | 88.4 | 87.6 | 86.9 | 86.1 | 85.4 | 84.6 | 83.9 | 83.1 | 82.3 | 81.6 | 80.8 | 42 | |
| | 41 | 91.3 | 90.6 | 89.8 | 89.0 | 88.3 | 87.5 | 86.8 | 86.0 | 85.2 | 84.5 | 83.7 | 82.9 | 82.2 | 81.4 | 80.6 | 41 | |
| | 49 | 90.8 | 90.1 | 89.4 | 88.8 | 88.1 | 87.5 | 86.8 | 86.1 | 85.5 | 84.8 | 84.1 | 83.5 | 82.8 | 82.1 | 81.5 | 49 | |
| | 48 | 90.7 | 90.1 | 89.4 | 88.7 | 88.1 | 87.4 | 86.7 | 86.0 | 85.4 | 84.7 | 84.0 | 83.3 | 82.6 | 81.9 | 81.3 | 48 | |
| | 47 | 90.7 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.6 | 85.9 | 85.3 | 84.6 | 83.9 | 83.2 | 82.5 | 81.8 | 81.1 | 47 | |
| 6-04 | 46 | 90.7 | 90.0 | 89.3 | 88.6 | 87.9 | 87.2 | 86.5 | 85.8 | 85.1 | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 46 | 5-56 |
| | 45 | 90.7 | 90.0 | 89.3 | 88.6 | 87.9 | 87.2 | 86.5 | 85.7 | 85.0 | 84.3 | 83.6 | 82.9 | 82.2 | 81.4 | 80.7 | 45 | |
| | 44 | 90.7 | 90.0 | 89.3 | 88.5 | 87.8 | 87.1 | 86.4 | 85.6 | 84.9 | 84.2 | 83.5 | 82.7 | 82.0 | 81.2 | 80.5 | 44 | |
| | 43 | 90.7 | 90.0 | 89.2 | 88.5 | 87.8 | 87.0 | 86.3 | 85.5 | 84.8 | 84.1 | 83.3 | 82.6 | 81.8 | 81.1 | 80.3 | 43 | |
| | 42 | 90.7 | 89.9 | 89.2 | 88.4 | 87.7 | 87.0 | 86.2 | 85.5 | 84.7 | 83.9 | 83.2 | 82.4 | 81.7 | 80.9 | 80.2 | 42 | |
| | 41 | 90.7 | 89.9 | 89.2 | 88.4 | 87.6 | 86.9 | 86.1 | 85.4 | 84.6 | 83.8 | 83.1 | 82.3 | 81.5 | 80.8 | 80.0 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

6 hrs. 36 m. to 6 hrs. 4 m. 5 hrs. 24 m. to 5 hrs. 56 m.

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 86.7 | 85.9 | 85.2 | 84.5 | 83.8 | 83.0 | 82.3 | 81.5 | 80.8 | 80.0 | 79.2 | 78.4 | 77.7 | 76.8 | 76.0 | 49 | |
| | 48 | 86.4 | 85.6 | 84.9 | 84.2 | 83.4 | 82.7 | 81.9 | 81.1 | 80.4 | 79.6 | 78.8 | 78.0 | 77.2 | 76.4 | 75.5 | 48 | |
| | 47 | 86.1 | 85.3 | 84.6 | 83.8 | 83.1 | 82.3 | 81.5 | 80.7 | 80.0 | 79.2 | 78.4 | 77.5 | 76.7 | 75.9 | 75.1 | 47 | |
| | 46 | 85.7 | 85.0 | 84.2 | 83.5 | 82.7 | 81.9 | 81.1 | 80.3 | 79.6 | 78.7 | 77.9 | 77.1 | 76.3 | 75.4 | 74.6 | 46 | |
| 6-36 | 45 | 85.4 | 84.7 | 83.9 | 83.1 | 82.3 | 81.6 | 80.8 | 79.9 | 79.1 | 78.3 | 77.5 | 76.7 | 75.8 | 75.0 | 74.1 | 45 | 5-24 |
| | 44 | 85.1 | 84.4 | 83.6 | 82.8 | 82.0 | 81.2 | 80.4 | 79.6 | 78.7 | 77.9 | 77.1 | 76.2 | 75.4 | 74.5 | 73.6 | 44 | |
| | 43 | 84.8 | 84.1 | 83.3 | 82.5 | 81.7 | 80.8 | 80.0 | 79.2 | 78.4 | 77.5 | 76.7 | 75.8 | 74.9 | 74.1 | 73.2 | 43 | |
| | 42 | 84.5 | 83.7 | 82.9 | 82.1 | 81.3 | 80.5 | 79.6 | 78.8 | 77.9 | 77.1 | 76.2 | 75.4 | 74.5 | 73.6 | 72.7 | 42 | |
| | 41 | 84.2 | 83.4 | 82.6 | 81.8 | 81.0 | 80.1 | 79.3 | 78.4 | 77.6 | 76.7 | 75.8 | 75.0 | 74.1 | 73.2 | 72.3 | 41 | |
| | 49 | 85.9 | 85.2 | 84.5 | 83.8 | 83.0 | 82.3 | 81.6 | 80.8 | 80.1 | 79.3 | 78.5 | 77.8 | 77.0 | 76.2 | 75.4 | 49 | |
| | 48 | 85.6 | 84.9 | 84.2 | 83.4 | 82.7 | 81.9 | 81.2 | 80.4 | 79.7 | 78.9 | 78.1 | 77.3 | 76.5 | 75.7 | 74.9 | 48 | |
| | 47 | 85.3 | 84.6 | 83.8 | 83.1 | 82.4 | 81.6 | 80.8 | 80.0 | 79.3 | 78.5 | 77.7 | 76.9 | 76.1 | 75.2 | 74.4 | 47 | |
| | 46 | 85.0 | 84.3 | 83.5 | 82.8 | 82.0 | 81.2 | 80.4 | 79.7 | 78.9 | 78.1 | 77.3 | 76.4 | 75.6 | 74.8 | 73.9 | 46 | |
| 6-32 | 45 | 84.8 | 84.0 | 83.2 | 82.5 | 81.7 | 80.9 | 80.1 | 79.3 | 78.5 | 77.7 | 76.9 | 76.0 | 75.2 | 74.3 | 73.5 | 45 | 5-28 |
| | 44 | 84.5 | 83.7 | 82.9 | 82.1 | 81.3 | 80.5 | 79.7 | 78.9 | 78.1 | 77.3 | 76.4 | 75.6 | 74.8 | 73.9 | 73.0 | 44 | |
| | 43 | 84.2 | 83.4 | 82.6 | 81.8 | 81.0 | 80.2 | 79.4 | 78.6 | 77.7 | 76.9 | 76.0 | 75.2 | 74.3 | 73.5 | 72.6 | 43 | |
| | 42 | 83.9 | 83.1 | 82.3 | 81.5 | 80.7 | 79.9 | 79.0 | 78.2 | 77.3 | 76.5 | 75.6 | 74.8 | 73.9 | 73.0 | 72.2 | 42 | |
| | 41 | 83.6 | 82.8 | 82.0 | 81.2 | 80.3 | 79.5 | 78.7 | 77.8 | 77.0 | 76.1 | 75.3 | 74.4 | 73.5 | 72.6 | 71.7 | 41 | |
| | 49 | 85.2 | 84.5 | 83.8 | 83.0 | 82.3 | 81.6 | 80.9 | 80.1 | 79.4 | 78.6 | 77.8 | 77.1 | 76.3 | 75.5 | 74.7 | 49 | |
| | 48 | 84.9 | 84.2 | 83.4 | 82.7 | 82.0 | 81.2 | 80.5 | 79.7 | 79.0 | 78.2 | 77.4 | 76.6 | 75.8 | 75.0 | 74.2 | 48 | |
| | 47 | 84.6 | 83.9 | 83.1 | 82.4 | 81.7 | 80.9 | 80.1 | 79.4 | 78.6 | 77.8 | 77.0 | 76.2 | 75.4 | 74.6 | 73.8 | 47 | |
| | 46 | 84.3 | 83.6 | 82.8 | 82.1 | 81.3 | 80.6 | 79.8 | 79.0 | 78.2 | 77.4 | 76.6 | 75.8 | 75.0 | 74.2 | 73.3 | 46 | |
| 6-28 | 45 | 84.1 | 83.3 | 82.5 | 81.8 | 81.0 | 80.2 | 79.4 | 78.6 | 77.8 | 77.0 | 76.2 | 75.4 | 74.6 | 73.7 | 72.9 | 45 | 5-32 |
| | 44 | 83.8 | 83.0 | 82.2 | 81.5 | 80.7 | 79.9 | 79.1 | 78.3 | 77.5 | 76.6 | 75.8 | 75.0 | 74.1 | 73.3 | 72.4 | 44 | |
| | 43 | 83.5 | 82.7 | 82.0 | 81.1 | 80.5 | 79.6 | 78.7 | 77.9 | 77.1 | 76.3 | 75.4 | 74.6 | 73.7 | 72.9 | 72.0 | 43 | |
| | 42 | 83.2 | 82.5 | 81.7 | 80.9 | 80.0 | 79.2 | 78.4 | 77.6 | 76.7 | 75.9 | 75.1 | 74.2 | 73.3 | 72.5 | 71.6 | 42 | |
| | 41 | 83.0 | 82.2 | 81.4 | 80.5 | 79.7 | 78.9 | 78.1 | 77.2 | 76.4 | 75.5 | 74.7 | 73.8 | 72.9 | 72.1 | 71.2 | 41 | |
| | 49 | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 80.1 | 79.4 | 78.7 | 77.9 | 77.1 | 76.4 | 75.6 | 74.8 | 74.0 | 49 | |
| | 48 | 84.2 | 83.5 | 82.7 | 82.0 | 81.3 | 80.5 | 79.8 | 79.0 | 78.3 | 77.5 | 76.7 | 76.0 | 75.2 | 74.4 | 73.6 | 48 | |
| | 47 | 83.9 | 83.2 | 82.4 | 81.7 | 81.0 | 80.2 | 79.4 | 78.7 | 77.9 | 77.1 | 76.3 | 75.6 | 74.8 | 73.9 | 73.1 | 47 | |
| | 46 | 83.6 | 82.9 | 82.1 | 81.4 | 80.7 | 79.9 | 79.1 | 78.3 | 77.6 | 76.8 | 76.0 | 75.2 | 74.3 | 73.5 | 72.7 | 46 | |
| 6-24 | 45 | 83.4 | 82.6 | 81.9 | 81.1 | 80.3 | 79.6 | 78.8 | 78.0 | 77.2 | 76.4 | 75.6 | 74.8 | 73.9 | 73.1 | 72.3 | 45 | 5-36 |
| | 44 | 83.1 | 82.4 | 81.6 | 80.8 | 80.0 | 79.2 | 78.4 | 77.6 | 76.8 | 76.0 | 75.2 | 74.4 | 73.5 | 72.7 | 71.8 | 44 | |
| | 43 | 82.9 | 82.1 | 81.3 | 80.5 | 79.7 | 78.9 | 78.1 | 77.3 | 76.5 | 75.7 | 74.8 | 74.0 | 73.1 | 72.3 | 71.4 | 43 | |
| | 42 | 82.6 | 81.8 | 81.0 | 80.2 | 79.4 | 78.6 | 77.8 | 77.0 | 76.1 | 75.3 | 74.5 | 73.6 | 72.8 | 71.9 | 71.0 | 42 | |
| | 41 | 82.4 | 81.6 | 80.7 | 79.9 | 79.1 | 78.3 | 77.5 | 76.6 | 75.8 | 74.9 | 74.1 | 73.2 | 72.4 | 71.5 | 70.6 | 41 | |
| | 49 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 80.2 | 79.4 | 78.7 | 77.9 | 77.2 | 76.4 | 75.7 | 74.9 | 74.1 | 73.4 | 49 | |
| | 48 | 83.4 | 82.7 | 82.0 | 81.3 | 80.6 | 79.8 | 79.1 | 78.3 | 77.6 | 76.8 | 76.1 | 75.3 | 74.5 | 73.7 | 72.9 | 48 | |
| | 47 | 83.2 | 82.5 | 81.7 | 81.0 | 80.3 | 79.5 | 78.8 | 78.0 | 77.2 | 76.5 | 75.7 | 74.9 | 74.1 | 73.3 | 72.5 | 47 | |
| | 46 | 82.9 | 82.2 | 81.5 | 80.7 | 80.0 | 79.2 | 78.4 | 77.7 | 76.9 | 76.1 | 75.3 | 74.5 | 73.7 | 72.9 | 72.1 | 46 | |
| 6-20 | 45 | 82.7 | 81.9 | 81.2 | 80.4 | 79.7 | 78.9 | 78.1 | 77.3 | 76.5 | 75.7 | 74.9 | 74.1 | 73.3 | 72.5 | 71.7 | 45 | 5-40 |
| | 44 | 82.4 | 81.7 | 80.9 | 80.1 | 79.4 | 78.6 | 77.8 | 77.0 | 76.2 | 75.4 | 74.6 | 73.8 | 72.9 | 72.1 | 71.2 | 44 | |
| | 43 | 82.2 | 81.4 | 80.7 | 79.9 | 79.1 | 78.3 | 77.5 | 76.7 | 75.9 | 75.0 | 74.2 | 73.4 | 72.5 | 71.7 | 70.8 | 43 | |
| | 42 | 82.0 | 81.2 | 80.4 | 79.6 | 78.8 | 78.0 | 77.2 | 76.4 | 75.6 | 74.7 | 73.9 | 73.0 | 72.2 | 71.3 | 70.5 | 42 | |
| | 41 | 81.7 | 80.9 | 80.1 | 79.3 | 78.5 | 77.7 | 76.9 | 76.0 | 75.2 | 74.4 | 73.5 | 72.7 | 71.8 | 70.9 | 70.1 | 41 | |
| | 49 | 83.0 | 82.3 | 81.6 | 80.9 | 80.1 | 79.4 | 78.7 | 78.0 | 77.2 | 76.5 | 75.8 | 75.0 | 74.2 | 73.5 | 72.7 | 49 | |
| | 48 | 82.7 | 82.0 | 81.3 | 80.6 | 79.9 | 79.1 | 78.4 | 77.6 | 76.9 | 76.1 | 75.4 | 74.6 | 73.8 | 73.1 | 72.3 | 48 | |
| | 47 | 82.5 | 81.8 | 81.0 | 80.3 | 79.6 | 78.8 | 78.1 | 77.3 | 76.5 | 75.8 | 75.0 | 74.2 | 73.4 | 72.7 | 71.8 | 47 | |
| | 46 | 82.2 | 81.5 | 80.8 | 80.0 | 79.3 | 78.5 | 77.7 | 77.0 | 76.2 | 75.4 | 74.7 | 73.9 | 73.1 | 72.3 | 71.4 | 46 | |
| 6-16 | 45 | 82.0 | 81.3 | 80.5 | 79.8 | 79.0 | 78.2 | 77.4 | 76.7 | 75.9 | 75.1 | 74.3 | 73.5 | 72.7 | 71.9 | 71.0 | 45 | 5-44 |
| | 44 | 81.8 | 81.0 | 80.2 | 79.5 | 78.7 | 77.9 | 77.1 | 76.4 | 75.6 | 74.8 | 74.0 | 73.1 | 72.3 | 71.5 | 70.7 | 44 | |
| | 43 | 81.5 | 80.8 | 80.0 | 79.2 | 78.4 | 77.6 | 76.8 | 76.0 | 75.2 | 74.4 | 73.6 | 72.8 | 72.0 | 71.1 | 70.3 | 43 | |
| | 42 | 81.3 | 80.5 | 79.7 | 78.9 | 78.1 | 77.4 | 76.6 | 75.7 | 74.8 | 74.1 | 73.3 | 72.4 | 71.6 | 70.7 | 69.9 | 42 | |
| | 41 | 81.1 | 80.3 | 79.5 | 78.7 | 77.9 | 77.1 | 76.3 | 75.4 | 74.6 | 73.8 | 72.9 | 72.1 | 71.2 | 70.4 | 69.5 | 41 | |
| | 49 | 82.2 | 81.5 | 80.8 | 80.1 | 79.4 | 78.7 | 78.0 | 77.3 | 76.5 | 75.8 | 75.1 | 74.3 | 73.6 | 72.8 | 72.0 | 49 | |
| | 48 | 82.0 | 81.3 | 80.6 | 79.9 | 79.2 | 78.4 | 77.7 | 77.0 | 76.2 | 75.5 | 74.7 | 73.9 | 73.2 | 72.4 | 71.6 | 48 | |
| | 47 | 81.8 | 81.1 | 80.3 | 79.6 | 78.9 | 78.1 | 77.4 | 76.6 | 75.9 | 75.1 | 74.4 | 73.6 | 72.8 | 72.0 | 71.2 | 47 | |
| | 46 | 81.5 | 80.8 | 80.1 | 79.3 | 78.6 | 7.8 | 77.1 | 76.3 | 75.6 | 74.8 | 74.0 | 73.2 | 72.4 | 71.6 | 70.8 | 46 | |
| 6-12 | 45 | 81.3 | 80.6 | 79.8 | 79.1 | 78.3 | 77.6 | 76.8 | 76.0 | 75.2 | 74.5 | 73.7 | 72.9 | 72.1 | 71.3 | 70.4 | 45 | 5-48 |
| | 44 | 81.1 | 80.4 | 79.6 | 78.8 | 78.1 | 77.3 | 76.5 | 75.7 | 74.9 | 74.1 | 73.3 | 72.5 | 71.7 | 70.9 | 70.1 | 44 | |
| | 43 | 80.9 | 80.1 | 79.4 | 78.6 | 77.8 | 77.0 | 76.2 | 75.4 | 74.6 | 73.8 | 73.0 | 72.2 | 71.4 | 70.5 | 69.7 | 43 | |
| | 42 | 80.7 | 79.9 | 79.1 | 78.3 | 77.5 | 76.7 | 75.9 | 75.1 | 74.3 | 73.5 | 72.7 | 71.8 | 71.0 | 70.2 | 69.3 | 42 | |
| | 41 | 80.5 | 79.7 | 78.9 | 78.1 | 77.3 | 76.5 | 75.7 | 74.8 | 74.0 | 73.2 | 72.4 | 71.5 | 70.7 | 69.8 | 69.0 | 41 | |
| | 49 | 81.5 | 80.8 | 80.1 | 79.4 | 78.7 | 78.0 | 77.3 | 76.6 | 75.8 | 75.1 | 74.4 | 73.6 | 72.9 | 72.1 | 71.3 | 49 | |
| | 48 | 81.3 | 80.6 | 79.9 | 79.2 | 78.4 | 77.7 | 77.0 | 76.3 | 75.5 | 74.8 | 74.0 | 73.3 | 72.5 | 71.7 | 71.0 | 48 | |
| | 47 | 81.1 | 80.3 | 79.6 | 78.9 | 78.2 | 77.4 | 76.7 | 76.0 | 75.2 | 74.4 | 73.7 | 72.9 | 72.1 | 71.4 | 70.6 | 47 | |
| | 46 | 80.8 | 80.1 | 79.4 | 78.7 | 77.9 | 77.2 | 76.4 | 75.7 | 74.9 | 74.1 | 73.4 | 72.6 | 71.8 | 71.0 | 70.2 | 46 | |
| 6-08 | 45 | 80.6 | 79.9 | 79.2 | 78.4 | 77.7 | 76.9 | 76.1 | 75.4 | 74.6 | 73.8 | 73.0 | 72.2 | 71.4 | 70.6 | 69.8 | 45 | 5-52 |
| | 44 | 80.4 | 79.7 | 78.9 | 78.2 | 77.4 | 76.6 | 75.9 | 75.1 | 74.3 | 73.5 | 72.7 | 71.9 | 71.1 | 70.3 | 69.5 | 44 | |
| | 43 | 80.2 | 79.5 | 78.7 | 77.9 | 77.1 | 76.4 | 75.6 | 74.8 | 74.0 | 73.2 | 72.4 | 71.6 | 70.8 | 69.9 | 69.1 | 43 | |
| | 42 | 80.0 | 79.3 | 78.5 | 77.7 | 76.9 | 76.1 | 75.3 | 74.5 | 73.7 | 72.9 | 72.1 | 71.3 | 70.4 | 69.6 | 68.8 | 42 | |
| | 41 | 79.8 | 79.0 | 78.2 | 77.5 | 76.7 | 75.9 | 75.1 | 74.2 | 73.4 | 72.6 | 71.8 | 70.9 | 70.1 | 69.3 | 68.4 | 41 | |
| | 49 | 80.8 | 80.1 | 79.4 | 78.7 | 78.0 | 77.3 | 76.6 | 75.9 | 75.1 | 74.4 | 73.7 | 72.9 | 72.2 | 71.4 | 70.7 | 49 | |
| | 48 | 80.6 | 79.9 | 79.1 | 78.4 | 77.7 | 77.0 | 76.3 | 75.6 | 74.8 | 74.1 | 73.3 | 72.6 | 71.8 | 71.1 | 70.3 | 48 | |
| | 47 | 80.4 | 79.6 | 78.9 | 78.2 | 77.5 | 76.8 | 76.0 | 75.3 | 74.5 | 73.8 | 73.0 | 72.3 | 71.5 | 70.7 | 69.9 | 47 | |
| | 46 | 80.1 | 79.4 | 78.7 | 78.0 | 77.2 | 76.5 | 75.7 | 75.0 | 74.2 | 73.5 | 72.7 | 71.9 | 71.1 | 70.4 | 69.6 | 46 | |
| 6-04 | 45 | 80.0 | 79.2 | 78.5 | 77.7 | 77.0 | 76.2 | 75.5 | 74.7 | 73.9 | 73.2 | 72.4 | 71.6 | 70.8 | 70.0 | 69.2 | 45 | 5-56 |
| | 44 | 79.8 | 79.0 | 78.3 | 77.5 | 76.7 | 76.0 | 75.2 | 74.4 | 73.7 | 72.9 | 72.1 | 71.3 | 70.5 | 69.7 | 68.9 | 44 | |
| | 43 | 79.6 | 78.8 | 78.1 | 77.3 | 76.5 | 75.7 | 74.9 | 74.2 | 73.4 | 72.6 | 71.8 | 71.0 | 70.2 | 69.3 | 68.5 | 43 | |
| | 42 | 79.3 | 78.6 | 77.8 | 77.1 | 76.3 | 75.5 | 74.7 | 73.9 | 73.1 | 72.3 | 71.5 | 70.7 | 69.8 | 69.0 | 68.2 | 42 | |
| | 41 | 79.2 | 78.4 | 77.6 | 76.8 | 76.0 | 75.4 | 74.5 | 73.6 | 72.8 | 72.0 | 71.2 | 70.4 | 69.5 | 68.7 | 67.9 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 90.8 | 90.1 | 89.4 | 88.8 | 88.1 | 87.5 | 86.8 | 86.1 | 85.5 | 84.8 | 84.1 | 83.5 | 82.8 | 82.1 | 81.5 | 49 | |
| | 48 | 90.7 | 90.1 | 89.4 | 88.7 | 88.1 | 87.4 | 86.7 | 86.0 | 85.4 | 84.7 | 84.0 | 83.3 | 82.6 | 81.9 | 81.3 | 48 | |
| | 47 | 90.7 | 90.1 | 89.4 | 88.7 | 88.0 | 87.3 | 86.6 | 85.9 | 85.3 | 84.6 | 83.9 | 83.2 | 82.5 | 81.8 | 81.1 | 47 | |
| | 46 | 90.7 | 90.0 | 89.3 | 88.6 | 87.9 | 87.2 | 86.5 | 85.8 | 85.1 | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 46 | |
| 6-04 | 45 | 90.7 | 90.0 | 89.3 | 88.6 | 87.9 | 87.2 | 86.5 | 85.7 | 85.0 | 84.3 | 83.6 | 82.9 | 82.2 | 81.4 | 80.7 | 45 | 5-56 |
| | 44 | 90.7 | 90.0 | 89.3 | 88.5 | 87.8 | 87.1 | 86.4 | 85.6 | 84.9 | 84.2 | 83.5 | 82.7 | 82.0 | 81.2 | 80.5 | 44 | |
| | 43 | 90.7 | 90.0 | 89.2 | 88.5 | 87.8 | 87.0 | 86.3 | 85.5 | 84.8 | 84.1 | 83.3 | 82.6 | 81.8 | 81.1 | 80.3 | 43 | |
| | 42 | 90.7 | 89.9 | 89.2 | 88.4 | 87.7 | 87.0 | 86.2 | 85.5 | 84.7 | 83.9 | 83.2 | 82.4 | 81.7 | 80.9 | 80.2 | 42 | |
| | 41 | 90.7 | 89.9 | 89.2 | 88.4 | 87.6 | 86.9 | 86.1 | 85.4 | 84.6 | 83.8 | 83.1 | 82.3 | 81.5 | 80.8 | 80.0 | 41 | |
| | 49 | 90.0 | 89.4 | 88.7 | 88.0 | 87.4 | 86.7 | 86.1 | 85.4 | 84.7 | 84.1 | 83.4 | 82.7 | 82.1 | 81.4 | 80.7 | 49 | |
| | 48 | 90.0 | 89.3 | 88.7 | 88.0 | 87.3 | 86.7 | 86.0 | 85.3 | 84.6 | 84.0 | 83.3 | 82.6 | 81.9 | 81.2 | 80.5 | 48 | |
| | 47 | 90.0 | 89.3 | 88.6 | 88.0 | 87.3 | 86.6 | 85.9 | 85.2 | 84.5 | 83.8 | 83.2 | 82.5 | 81.8 | 81.1 | 80.4 | 47 | |
| | 46 | 90.0 | 89.3 | 88.6 | 87.9 | 87.2 | 86.5 | 85.8 | 85.1 | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 80.2 | 46 | |
| 6-00 | 45 | 90.0 | 89.3 | 88.6 | 87.9 | 87.2 | 86.5 | 85.8 | 85.0 | 84.3 | 83.6 | 82.9 | 82.2 | 81.5 | 80.7 | 80.0 | 45 | 6-00 |
| | 44 | 90.0 | 89.3 | 88.6 | 87.8 | 87.1 | 86.4 | 85.7 | 85.0 | 84.2 | 83.5 | 82.8 | 82.0 | 81.3 | 80.6 | 79.8 | 44 | |
| | 43 | 90.0 | 89.3 | 88.5 | 87.8 | 87.1 | 86.3 | 85.6 | 84.9 | 84.1 | 83.4 | 82.7 | 81.9 | 81.2 | 80.4 | 79.7 | 43 | |
| | 42 | 90.0 | 89.3 | 88.5 | 87.8 | 87.0 | 86.3 | 85.5 | 84.8 | 84.0 | 83.3 | 82.5 | 81.8 | 81.0 | 80.3 | 79.5 | 42 | |
| | 41 | 90.0 | 89.3 | 88.5 | 87.7 | 87.0 | 86.2 | 85.5 | 84.7 | 84.0 | 83.2 | 82.4 | 81.7 | 80.9 | 80.1 | 79.4 | 41 | |
| | 49 | .... | 88.6 | 87.9 | 87.3 | 86.6 | 86.0 | 85.3 | 84.7 | 84.0 | 83.3 | 82.7 | 82.0 | 81.3 | 80.7 | 80.0 | 49 | |
| | 48 | .... | .... | 87.9 | 87.3 | 86.6 | 85.9 | 85.2 | 84.6 | 83.9 | 83.2 | 82.5 | 81.9 | 81.2 | 80.5 | 79.8 | 48 | |
| | 47 | .... | .... | 87.9 | 87.2 | 86.5 | 85.9 | 85.2 | 84.5 | 83.8 | 83.1 | 82.4 | 81.7 | 81.0 | 80.3 | 79.7 | 47 | |
| | 46 | .... | .... | 87.9 | 87.2 | 86.5 | 85.8 | 85.1 | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 80.2 | 79.5 | 46 | |
| 5-56 | 45 | .... | .... | 87.9 | 87.2 | 86.5 | 85.8 | 85.1 | 84.3 | 83.6 | 82.9 | 82.2 | 81.5 | 80.8 | 80.1 | 79.3 | 45 | 6-04 |
| | 44 | .... | .... | 87.9 | 87.1 | 86.4 | 85.7 | 85.0 | 84.3 | 83.5 | 82.8 | 82.1 | 81.4 | 80.6 | 79.9 | 79.2 | 44 | |
| | 43 | .... | .... | 87.9 | 87.1 | 86.4 | 85.7 | 84.9 | 84.2 | 83.5 | 82.7 | 82.0 | 81.2 | 80.5 | 79.8 | 79.0 | 43 | |
| | 42 | .... | .... | 87.8 | 87.1 | 86.4 | 85.6 | 84.9 | 84.1 | 83.4 | 82.6 | 81.9 | 81.1 | 80.4 | 79.6 | 78.9 | 42 | |
| | 41 | .... | .... | 87.8 | 87.1 | 86.3 | 85.6 | 84.8 | 84.1 | 83.3 | 82.5 | 81.8 | 81.0 | 80.3 | 79.5 | 78.7 | 41 | |
| | 49 | .... | .... | 87.2 | 86.5 | 85.9 | 85.2 | 84.6 | 83.9 | 83.2 | 82.6 | 81.9 | 81.3 | 80.6 | 79.9 | 79.3 | 49 | |
| | 48 | .... | .... | 87.2 | 86.5 | 85.8 | 85.2 | 84.5 | 83.8 | 83.2 | 82.5 | 81.8 | 81.1 | 80.4 | 79.8 | 79.1 | 48 | |
| | 47 | .... | .... | 87.2 | 86.5 | 85.8 | 85.1 | 84.5 | 83.8 | 83.1 | 82.4 | 81.7 | 81.0 | 80.3 | 79.6 | 79.0 | 47 | |
| | 46 | .... | .... | .... | 86.5 | 85.8 | 85.1 | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 80.2 | 79.5 | 78.8 | 46 | |
| 5-52 | 45 | .... | .... | .... | 86.5 | 85.8 | 85.0 | 84.3 | 83.6 | 82.9 | 82.2 | 81.5 | 80.8 | 80.1 | 79.4 | 78.6 | 45 | 6-08 |
| | 44 | .... | .... | .... | 86.4 | 85.7 | 85.0 | 84.3 | 83.6 | 82.9 | 82.1 | 81.4 | 80.7 | 79.9 | 79.2 | 78.5 | 44 | |
| | 43 | .... | .... | .... | 86.4 | 85.7 | 85.0 | 84.2 | 83.5 | 82.8 | 82.0 | 81.3 | 80.6 | 79.8 | 79.1 | 78.3 | 43 | |
| | 42 | .... | .... | .... | 86.4 | 85.7 | 85.0 | 84.2 | 83.5 | 82.8 | 82.0 | 81.2 | 80.5 | 79.7 | 79.0 | 78.2 | 42 | |
| | 41 | .... | .... | .... | 86.4 | 85.7 | 84.9 | 84.2 | 83.4 | 82.7 | 81.9 | 81.1 | 80.4 | 79.6 | 78.8 | 78.1 | 41 | |
| | 49 | .... | .... | .... | 85.8 | 85.1 | 84.5 | 83.8 | 83.2 | 82.5 | 81.8 | 81.2 | 80.5 | 79.9 | 79.2 | 78.5 | 49 | |
| | 48 | .... | .... | .... | 85.8 | 85.1 | 84.4 | 83.8 | 83.1 | 82.4 | 81.7 | 81.1 | 80.4 | 79.7 | 79.0 | 78.4 | 48 | |
| | 47 | .... | .... | .... | 85.8 | 85.1 | 84.4 | 83.7 | 83.0 | 82.4 | 81.7 | 81.0 | 80.3 | 79.6 | 78.9 | 78.2 | 47 | |
| | 46 | .... | .... | .... | .... | 85.1 | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 80.2 | 79.5 | 78.8 | 78.1 | 46 | |
| 5-48 | 45 | .... | .... | .... | .... | 85.1 | 84.3 | 83.6 | 82.9 | 82.2 | 81.5 | 80.8 | 80.1 | 79.4 | 78.7 | 78.0 | 45 | 6-12 |
| | 44 | .... | .... | .... | .... | 85.1 | 84.3 | 83.6 | 82.9 | 82.2 | 81.4 | 80.7 | 80.0 | 79.3 | 78.5 | 77.9 | 44 | |
| | 43 | .... | .... | .... | .... | 85.0 | 84.3 | 83.6 | 82.8 | 82.1 | 81.4 | 80.6 | 79.9 | 79.2 | 78.4 | 77.7 | 43 | |
| | 42 | .... | .... | .... | .... | 85.0 | 84.3 | 83.6 | 82.8 | 82.1 | 81.3 | 80.6 | 79.8 | 79.1 | 78.3 | 77.6 | 42 | |
| | 41 | .... | .... | .... | .... | 85.0 | 84.3 | 83.5 | 82.8 | 82.0 | 81.2 | 80.5 | 79.7 | 79.0 | 78.2 | 77.4 | 41 | |
| | 49 | .... | .... | .... | .... | 84.4 | 83.7 | 83.1 | 82.4 | 81.7 | 81.1 | 80.4 | 79.8 | 79.1 | 78.5 | 77.8 | 49 | |
| | 48 | .... | .... | .... | .... | 84.4 | 83.7 | 83.0 | 82.3 | 81.7 | 81.0 | 80.3 | 79.7 | 79.0 | 78.3 | 77.6 | 48 | |
| | 47 | .... | .... | .... | .... | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 80.3 | 79.6 | 78.9 | 78.2 | 77.5 | 47 | |
| | 46 | .... | .... | .... | .... | 84.4 | 83.7 | 83.0 | 82.3 | 81.6 | 80.9 | 80.2 | 79.5 | 78.8 | 78.1 | 77.4 | 46 | |
| 5-44 | 45 | .... | .... | .... | .... | .... | 83.6 | 82.9 | 82.2 | 81.5 | 80.8 | 80.1 | 79.4 | 78.7 | 78.0 | 77.3 | 45 | 6-16 |
| | 44 | .... | .... | .... | .... | .... | 83.6 | 82.9 | 82.2 | 81.5 | 80.8 | 80.0 | 79.3 | 78.6 | 77.9 | 77.1 | 44 | |
| | 43 | .... | .... | .... | .... | .... | 83.6 | 82.9 | 82.2 | 81.5 | 80.7 | 80.0 | 79.2 | 78.5 | 77.8 | 77.0 | 43 | |
| | 42 | .... | .... | .... | .... | .... | 83.6 | 82.9 | 82.1 | 81.4 | 80.7 | 79.9 | 79.1 | 78.4 | 77.7 | 76.9 | 42 | |
| | 41 | .... | .... | .... | .... | .... | 83.6 | 82.9 | 82.1 | 81.4 | 80.6 | 79.8 | 79.1 | 78.3 | 77.6 | 76.8 | 41 | |
| | 49 | .... | .... | .... | .... | .... | 83.0 | 82.3 | 81.7 | 81.0 | 80.3 | 79.7 | 79.0 | 78.4 | 77.7 | 77.0 | 49 | |
| | 48 | .... | .... | .... | .... | .... | 82.9 | 82.3 | 81.6 | 80.9 | 80.3 | 79.6 | 78.9 | 78.3 | 77.6 | 76.9 | 48 | |
| | 47 | .... | .... | .... | .... | .... | 82.9 | 82.3 | 81.6 | 80.9 | 80.2 | 79.5 | 78.9 | 78.2 | 77.5 | 76.8 | 47 | |
| | 46 | .... | .... | .... | .... | .... | 82.9 | 82.2 | 81.6 | 80.9 | 80.2 | 79.5 | 78.8 | 78.1 | 77.4 | 76.7 | 46 | |
| 5-40 | 45 | .... | .... | .... | .... | .... | .... | 82.2 | 81.5 | 80.8 | 80.1 | 79.4 | 78.7 | 78.0 | 77.3 | 76.6 | 45 | 6-20 |
| | 44 | .... | .... | .... | .... | .... | .... | 82.2 | 81.5 | 80.8 | 80.1 | 79.4 | 78.6 | 77.9 | 77.2 | 76.5 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | 82.2 | 81.5 | 80.8 | 80.0 | 79.3 | 78.6 | 77.8 | 77.1 | 76.4 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | 82.2 | 81.5 | 80.8 | 80.0 | 79.2 | 78.5 | 77.8 | 77.0 | 76.3 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | 82.2 | 81.5 | 80.7 | 79.9 | 79.2 | 78.4 | 77.7 | 76.9 | 76.2 | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | 81.5 | 80.9 | 80.2 | 79.6 | 78.9 | 78.3 | 77.6 | 77.0 | 76.3 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | 81.5 | 80.9 | 80.2 | 79.5 | 78.9 | 78.2 | 77.5 | 76.9 | 76.2 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | 81.5 | 80.9 | 80.2 | 79.5 | 78.8 | 78.1 | 77.5 | 76.8 | 76.1 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | 81.5 | 80.8 | 80.1 | 79.5 | 78.8 | 78.1 | 77.4 | 76.7 | 76.0 | 46 | |
| 5-36 | 45 | .... | .... | .... | .... | .... | .... | .... | 80.8 | 80.1 | 79.4 | 78.7 | 78.0 | 77.3 | 76.6 | 75.9 | 45 | 6-24 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | 80.8 | 80.1 | 79.4 | 78.7 | 77.9 | 77.2 | 76.5 | 75.8 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | 80.8 | 80.1 | 79.3 | 78.6 | 77.9 | 77.2 | 76.4 | 75.7 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | 80.8 | 80.1 | 79.3 | 78.6 | 77.8 | 77.1 | 76.4 | 75.6 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | 80.8 | 80.1 | 79.3 | 78.5 | 77.8 | 77.0 | 76.3 | 75.5 | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | 80.1 | 79.5 | 78.8 | 78.2 | 77.5 | 76.9 | 76.2 | 75.6 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | 80.1 | 79.5 | 78.8 | 78.1 | 77.5 | 76.8 | 76.1 | 75.5 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | 80.1 | 79.5 | 78.8 | 78.1 | 77.4 | 76.7 | 76.0 | 75.4 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | 80.1 | 79.4 | 78.7 | 78.1 | 77.4 | 76.7 | 76.0 | 75.3 | 46 | |
| 5-32 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | 79.4 | 78.7 | 78.0 | 77.3 | 76.6 | 75.9 | 75.2 | 45 | 6-28 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | 79.4 | 78.7 | 78.0 | 77.3 | 76.5 | 75.8 | 75.1 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | 79.4 | 78.7 | 77.9 | 77.2 | 76.5 | 75.7 | 75.0 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | 79.4 | 78.7 | 77.9 | 77.2 | 76.4 | 75.7 | 75.0 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 78.6 | 77.9 | 77.1 | 76.4 | 75.6 | 74.9 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

6 hrs. 4 m. to 5 hrs. 32 m. 5 hrs. 56 m. to 6 hrs. 28 m.

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 80.8 | 80.1 | 79.4 | 78.7 | 78.0 | 77.3 | 76.6 | 75.9 | 75.1 | 74.4 | 73.7 | 72.9 | 72.2 | 71.4 | 70.7 | 49 | |
| | 48 | 80.6 | 79.9 | 79.1 | 78.4 | 77.7 | 77.0 | 76.3 | 75.6 | 74.8 | 74.1 | 73.3 | 72.6 | 71.8 | 71.1 | 70.3 | 48 | |
| | 47 | 80.4 | 79.6 | 78.9 | 78.2 | 77.5 | 76.8 | 76.0 | 75.3 | 74.5 | 73.8 | 73.0 | 72.3 | 71.5 | 70.7 | 69.9 | 47 | |
| 6-04 | 46 | 80.1 | 79.4 | 78.7 | 78.0 | 77.2 | 76.5 | 75.7 | 75.0 | 74.2 | 73.5 | 72.7 | 71.9 | 71.1 | 70.4 | 69.6 | 46 | |
| | 45 | 80.0 | 79.2 | 78.5 | 77.7 | 77.0 | 76.2 | 75.5 | 74.7 | 73.9 | 73.2 | 72.4 | 71.6 | 70.8 | 70.0 | 69.2 | 45 | 5-56 |
| | 44 | 79.8 | 79.0 | 78.3 | 77.5 | 76.7 | 76.0 | 75.2 | 74.4 | 73.7 | 72.9 | 72.1 | 71.3 | 70.5 | 69.7 | 68.9 | 44 | |
| | 43 | 79.6 | 78.8 | 78.1 | 77.3 | 76.5 | 75.7 | 74.9 | 74.2 | 73.4 | 72.6 | 71.8 | 71.0 | 70.2 | 69.3 | 68.5 | 43 | |
| | 42 | 79.3 | 78.6 | 77.8 | 77.1 | 76.3 | 75.5 | 74.7 | 73.9 | 73.1 | 72.3 | 71.5 | 70.7 | 69.8 | 69.0 | 68.2 | 42 | |
| | 41 | 79.2 | 78.4 | 77.6 | 76.8 | 76.0 | 75.4 | 74.5 | 73.6 | 72.8 | 72.0 | 71.2 | 70.4 | 69.5 | 68.7 | 67.9 | 41 | |
| | 49 | 80.0 | 79.4 | 78.7 | 78.0 | 77.3 | 76.6 | 75.9 | 75.2 | 74.4 | 73.7 | 73.0 | 72.3 | 71.5 | 70.8 | 70.0 | 49 | |
| | 48 | 79.8 | 79.1 | 78.4 | 77.7 | 77.0 | 76.3 | 75.6 | 74.9 | 74.2 | 73.4 | 72.7 | 71.9 | 71.2 | 70.4 | 69.6 | 48 | |
| | 47 | 79.7 | 78.9 | 78.2 | 77.5 | 76.8 | 76.1 | 75.3 | 74.6 | 73.9 | 73.1 | 72.4 | 71.6 | 70.8 | 70.1 | 69.3 | 47 | |
| | 46 | 79.5 | 78.7 | 78.0 | 77.3 | 76.6 | 75.8 | 75.1 | 74.3 | 73.6 | 72.8 | 72.1 | 71.3 | 70.5 | 69.7 | 68.9 | 46 | |
| 6-00 | 45 | 79.3 | 78.5 | 77.8 | 77.1 | 76.3 | 75.6 | 74.8 | 74.1 | 73.3 | 72.5 | 71.8 | 71.0 | 70.2 | 69.4 | 68.6 | 45 | 6-00 |
| | 44 | 79.1 | 78.4 | 77.6 | 76.9 | 76.1 | 75.3 | 74.6 | 73.8 | 73.0 | 72.2 | 71.5 | 70.7 | 69.9 | 69.1 | 68.3 | 44 | |
| | 43 | 78.9 | 78.2 | 77.4 | 76.6 | 75.9 | 75.1 | 74.3 | 73.5 | 72.8 | 72.0 | 71.2 | 70.4 | 69.6 | 68.8 | 67.9 | 43 | |
| | 42 | 78.7 | 78.0 | 77.2 | 76.4 | 75.7 | 74.9 | 74.1 | 73.3 | 72.5 | 71.7 | 70.9 | 70.1 | 69.3 | 68.4 | 67.6 | 42 | |
| | 41 | 78.6 | 77.8 | 77.0 | 76.2 | 75.4 | 74.6 | 73.9 | 73.1 | 72.2 | 71.4 | 70.6 | 69.8 | 69.0 | 68.1 | 67.3 | 41 | |
| | 49 | 79.3 | 78.6 | 78.0 | 77.3 | 76.6 | 75.9 | 75.2 | 74.4 | 73.7 | 73.0 | 72.3 | 71.6 | 70.8 | 70.1 | 69.3 | 49 | |
| | 48 | 79.1 | 78.4 | 77.7 | 77.0 | 76.3 | 75.6 | 74.9 | 74.2 | 73.5 | 72.7 | 72.0 | 71.3 | 70.5 | 69.8 | 69.0 | 48 | |
| | 47 | 79.0 | 78.2 | 77.5 | 76.8 | 76.1 | 75.4 | 74.6 | 73.9 | 73.2 | 72.4 | 71.7 | 70.9 | 70.2 | 69.4 | 68.7 | 47 | |
| | 46 | 78.8 | 78.1 | 77.3 | 76.6 | 75.9 | 75.1 | 74.4 | 73.7 | 72.9 | 72.2 | 71.4 | 70.6 | 69.9 | 69.1 | 68.3 | 46 | |
| 5-56 | 45 | 78.6 | 77.9 | 77.1 | 76.4 | 75.7 | 74.9 | 74.1 | 73.4 | 72.7 | 71.9 | 71.1 | 70.3 | 69.6 | 68.8 | 68.0 | 45 | 6-04 |
| | 44 | 78.4 | 77.7 | 76.9 | 76.2 | 75.4 | 74.7 | 73.9 | 73.2 | 72.4 | 71.6 | 70.8 | 70.0 | 69.3 | 68.5 | 67.7 | 44 | |
| | 43 | 78.3 | 77.5 | 76.8 | 76.0 | 75.2 | 74.5 | 73.7 | 72.9 | 72.1 | 71.3 | 70.6 | 69.8 | 69.0 | 68.2 | 67.3 | 43 | |
| | 42 | 78.1 | 77.3 | 76.6 | 75.8 | 75.0 | 74.2 | 73.5 | 72.7 | 71.9 | 71.1 | 70.3 | 69.5 | 68.7 | 67.9 | 67.0 | 42 | |
| | 41 | 77.9 | 77.2 | 76.4 | 75.6 | 74.8 | 74.0 | 73.3 | 72.5 | 71.7 | 70.8 | 70.0 | 69.2 | 68.4 | 67.6 | 66.7 | 41 | |
| | 49 | 78.6 | 77.9 | 77.2 | 76.5 | 75.8 | 75.2 | 74.5 | 73.7 | 73.0 | 72.3 | 71.6 | 70.9 | 70.2 | 69.4 | 68.7 | 49 | |
| | 48 | 78.4 | 77.7 | 77.0 | 76.3 | 75.6 | 74.9 | 74.2 | 73.5 | 72.8 | 72.0 | 71.3 | 70.6 | 69.8 | 69.1 | 68.3 | 48 | |
| | 47 | 78.2 | 77.5 | 76.8 | 76.1 | 75.4 | 74.7 | 74.0 | 73.2 | 72.5 | 71.8 | 71.0 | 70.3 | 69.5 | 68.8 | 68.0 | 47 | |
| | 46 | 78.1 | 77.4 | 76.6 | 75.9 | 75.2 | 74.5 | 73.7 | 73.0 | 72.3 | 71.5 | 70.7 | 70.0 | 69.2 | 68.5 | 67.7 | 46 | |
| 5-52 | 45 | 77.9 | 77.2 | 76.5 | 75.7 | 75.0 | 74.3 | 73.5 | 72.8 | 72.0 | 71.2 | 70.5 | 69.7 | 68.9 | 68.2 | 67.4 | 45 | 6-08 |
| | 44 | 77.8 | 77.0 | 76.3 | 75.5 | 74.8 | 74.0 | 73.3 | 72.5 | 71.8 | 71.0 | 70.2 | 69.4 | 68.6 | 67.9 | 67.1 | 44 | |
| | 43 | 77.6 | 76.9 | 76.1 | 75.3 | 74.6 | 73.8 | 73.1 | 72.3 | 71.5 | 70.7 | 69.9 | 69.2 | 68.4 | 67.6 | 66.8 | 43 | |
| | 42 | 77.4 | 76.7 | 75.9 | 75.2 | 74.4 | 73.6 | 72.8 | 72.1 | 71.3 | 70.5 | 69.7 | 68.9 | 68.1 | 67.3 | 66.5 | 42 | |
| | 41 | 77.3 | 76.5 | 75.8 | 75.0 | 74.2 | 73.4 | 72.6 | 71.9 | 71.1 | 70.2 | 69.4 | 68.6 | 67.8 | 67.0 | 66.2 | 41 | |
| | 49 | 77.3 | 77.2 | 76.5 | 75.8 | 75.1 | 74.4 | 73.7 | 73.0 | 72.3 | 71.6 | 70.9 | 70.2 | 69.5 | 68.8 | 68.0 | 49 | |
| | 48 | 77.7 | 77.0 | 76.3 | 75.6 | 74.9 | 74.2 | 73.5 | 72.8 | 72.1 | 71.4 | 70.6 | 69.9 | 69.2 | 68.4 | 67.7 | 48 | |
| | 47 | 77.5 | 76.8 | 76.1 | 75.4 | 74.7 | 74.0 | 73.3 | 72.6 | 71.8 | 71.1 | 70.4 | 69.6 | 68.9 | 68.1 | 67.4 | 47 | |
| | 46 | 77.4 | 76.7 | 75.9 | 75.2 | 74.5 | 73.8 | 73.1 | 72.3 | 71.6 | 70.8 | 70.1 | 69.3 | 68.6 | 67.8 | 67.1 | 46 | |
| 5-48 | 45 | 77.2 | 76.5 | 75.8 | 75.1 | 74.3 | 73.6 | 72.8 | 72.1 | 71.3 | 70.6 | 69.8 | 69.1 | 68.3 | 67.5 | 66.8 | 45 | 6-12 |
| | 44 | 77.1 | 76.3 | 75.6 | 74.9 | 74.1 | 73.4 | 72.6 | 71.9 | 71.1 | 70.3 | 69.6 | 68.8 | 68.0 | 67.2 | 66.5 | 44 | |
| | 43 | 76.9 | 76.2 | 75.5 | 74.7 | 73.9 | 73.2 | 72.4 | 71.7 | 70.9 | 70.1 | 69.3 | 68.5 | 67.8 | 67.0 | 66.2 | 43 | |
| | 42 | 76.8 | 76.1 | 75.3 | 74.5 | 73.8 | 73.0 | 72.2 | 71.4 | 70.7 | 69.9 | 69.1 | 68.3 | 67.5 | 66.7 | 65.9 | 42 | |
| | 41 | 76.7 | 75.9 | 75.1 | 74.4 | 73.6 | 72.8 | 72.0 | 71.2 | 70.5 | 69.7 | 68.9 | 68.1 | 67.2 | 66.4 | 65.6 | 41 | |
| | 49 | 77.1 | 76.4 | 75.8 | 75.1 | 74.4 | 73.7 | 73.0 | 72.3 | 71.6 | 70.9 | 70.2 | 69.5 | 68.8 | 68.1 | 67.3 | 49 | |
| | 48 | 77.0 | 76.3 | 75.6 | 74.9 | 74.2 | 73.5 | 72.8 | 72.1 | 71.4 | 70.7 | 70.0 | 69.2 | 68.5 | 67.8 | 67.0 | 48 | |
| | 47 | 76.8 | 76.1 | 75.4 | 74.7 | 74.0 | 73.3 | 72.6 | 71.9 | 71.2 | 70.4 | 69.7 | 69.0 | 68.2 | 67.5 | 66.7 | 47 | |
| | 46 | 76.7 | 76.0 | 75.3 | 74.5 | 73.8 | 73.1 | 72.4 | 71.7 | 70.9 | 70.2 | 69.4 | 68.7 | 67.9 | 67.2 | 66.4 | 46 | |
| 5-44 | 45 | 76.5 | 75.8 | 75.1 | 74.4 | 73.7 | 72.9 | 72.2 | 71.4 | 70.7 | 69.9 | 69.2 | 68.4 | 67.7 | 66.9 | 66.1 | 45 | 6-16 |
| | 44 | 76.4 | 75.7 | 74.9 | 74.2 | 73.5 | 72.7 | 72.0 | 71.2 | 70.5 | 69.7 | 69.0 | 68.2 | 67.4 | 66.6 | 65.9 | 44 | |
| | 43 | 76.3 | 75.5 | 74.8 | 74.1 | 73.3 | 72.5 | 71.8 | 71.0 | 70.3 | 69.5 | 68.7 | 67.9 | 67.2 | 66.4 | 65.6 | 43 | |
| | 42 | 76.2 | 75.4 | 74.7 | 73.9 | 73.1 | 72.4 | 71.6 | 70.8 | 70.1 | 69.3 | 68.5 | 67.7 | 66.9 | 66.1 | 65.3 | 42 | |
| | 41 | 76.0 | 75.3 | 74.5 | 73.7 | 73.0 | 72.2 | 71.4 | 70.6 | 69.9 | 69.1 | 68.3 | 67.5 | 66.7 | 65.9 | 65.1 | 41 | |
| | 49 | 76.4 | 75.7 | 75.0 | 74.4 | 73.7 | 73.0 | 72.3 | 71.6 | 70.9 | 70.2 | 69.5 | 68.8 | 68.1 | 67.4 | 66.7 | 49 | |
| | 48 | 76.2 | 75.6 | 74.9 | 74.2 | 73.5 | 72.8 | 72.1 | 71.4 | 70.7 | 70.0 | 69.3 | 68.6 | 67.8 | 67.1 | 66.4 | 48 | |
| | 47 | 76.1 | 75.4 | 74.7 | 74.0 | 73.3 | 72.6 | 71.9 | 71.2 | 70.5 | 69.8 | 69.0 | 68.3 | 67.6 | 66.8 | 66.1 | 47 | |
| | 46 | 76.0 | 75.3 | 74.6 | 73.9 | 73.1 | 72.4 | 71.7 | 71.0 | 70.3 | 69.5 | 68.8 | 68.0 | 67.3 | 66.6 | 65.8 | 46 | |
| 5-40 | 45 | 75.9 | 75.1 | 74.4 | 73.7 | 73.0 | 72.3 | 71.5 | 70.8 | 70.0 | 69.3 | 68.6 | 67.8 | 67.0 | 66.3 | 65.5 | 45 | 6-20 |
| | 44 | 75.7 | 75.0 | 74.3 | 73.6 | 72.8 | 72.1 | 71.3 | 70.6 | 69.8 | 69.1 | 68.3 | 67.6 | 66.8 | 66.0 | 65.2 | 44 | |
| | 43 | 75.6 | 74.9 | 74.1 | 73.4 | 72.7 | 71.9 | 71.2 | 70.4 | 69.6 | 68.9 | 68.1 | 67.3 | 66.6 | 65.8 | 65.0 | 43 | |
| | 42 | 75.5 | 74.8 | 74.0 | 73.3 | 72.5 | 71.7 | 71.0 | 70.2 | 69.4 | 68.7 | 67.9 | 67.1 | 66.3 | 65.5 | 64.7 | 42 | |
| | 41 | 75.4 | 74.7 | 73.9 | 73.1 | 72.4 | 71.6 | 70.8 | 70.0 | 69.3 | 68.5 | 67.7 | 66.9 | 66.1 | 65.3 | 64.5 | 41 | |
| | 49 | 75.6 | 75.0 | 74.3 | 73.6 | 73.0 | 72.3 | 71.6 | 70.9 | 70.3 | 69.5 | 68.8 | 68.1 | 67.4 | 66.7 | 66.0 | 49 | |
| | 48 | 75.5 | 74.8 | 74.2 | 73.5 | 72.8 | 72.1 | 71.4 | 70.7 | 70.0 | 69.3 | 68.6 | 67.9 | 67.2 | 66.5 | 65.7 | 48 | |
| | 47 | 75.4 | 74.7 | 74.0 | 73.3 | 72.6 | 71.9 | 71.2 | 70.5 | 69.8 | 69.1 | 68.4 | 67.6 | 66.9 | 66.2 | 65.4 | 47 | |
| | 46 | 75.3 | 74.6 | 73.9 | 73.2 | 72.5 | 71.8 | 71.0 | 70.3 | 69.6 | 68.9 | 68.1 | 67.4 | 66.7 | 65.9 | 65.2 | 46 | |
| 5-36 | 45 | 75.2 | 74.5 | 73.8 | 73.0 | 72.3 | 71.6 | 70.9 | 70.1 | 69.4 | 68.7 | 67.9 | 67.2 | 66.4 | 65.7 | 64.9 | 45 | 6-24 |
| | 44 | 75.1 | 74.3 | 73.6 | 72.9 | 72.2 | 71.4 | 70.7 | 70.0 | 69.2 | 68.4 | 67.7 | 66.9 | 66.2 | 65.4 | 64.6 | 44 | |
| | 43 | 75.0 | 74.2 | 73.5 | 72.8 | 72.0 | 71.3 | 70.5 | 69.8 | 69.0 | 68.2 | 67.5 | 66.7 | 65.9 | 65.2 | 64.4 | 43 | |
| | 42 | 74.9 | 74.1 | 73.4 | 72.6 | 71.9 | 71.1 | 70.4 | 69.6 | 68.8 | 68.0 | 67.3 | 66.5 | 65.7 | 64.9 | 64.1 | 42 | |
| | 41 | 74.8 | 74.0 | 73.3 | 72.5 | 71.7 | 71.0 | 70.2 | 69.4 | 68.7 | 67.9 | 67.1 | 66.3 | 65.5 | 64.7 | 63.9 | 41 | |
| | 49 | 74.9 | 74.2 | 73.6 | 72.9 | 72.3 | 71.6 | 70.9 | 70.2 | 69.6 | 68.8 | 68.2 | 67.5 | 66.8 | 66.1 | 65.3 | 49 | |
| | 48 | 74.8 | 74.1 | 73.4 | 72.8 | 72.1 | 71.4 | 70.7 | 70.0 | 69.3 | 68.6 | 67.9 | 67.2 | 66.5 | 65.8 | 65.1 | 48 | |
| | 47 | 74.7 | 74.0 | 73.3 | 72.6 | 71.9 | 71.2 | 70.5 | 69.8 | 69.1 | 68.4 | 67.7 | 67.0 | 66.3 | 65.5 | 64.8 | 47 | |
| | 46 | 74.6 | 73.9 | 73.2 | 72.5 | 71.8 | 71.1 | 70.4 | 69.7 | 68.9 | 68.2 | 67.5 | 66.7 | 66.0 | 65.3 | 64.5 | 46 | |
| 5-32 | 45 | 74.5 | 73.8 | 73.1 | 72.4 | 71.6 | 70.9 | 70.2 | 69.5 | 68.7 | 68.0 | 67.3 | 66.5 | 65.8 | 65.0 | 64.3 | 45 | 6-28 |
| | 44 | 74.4 | 73.7 | 73.0 | 72.2 | 71.5 | 70.8 | 70.0 | 69.3 | 68.6 | 67.8 | 67.1 | 66.3 | 65.6 | 64.8 | 64.0 | 44 | |
| | 43 | 74.3 | 73.6 | 72.8 | 72.1 | 71.4 | 70.6 | 69.9 | 69.1 | 68.4 | 67.6 | 66.9 | 66.1 | 65.3 | 64.6 | 63.8 | 43 | |
| | 42 | 74.2 | 73.5 | 72.7 | 72.0 | 71.2 | 70.5 | 69.7 | 69.0 | 68.2 | 67.4 | 66.7 | 65.9 | 65.1 | 64.3 | 63.6 | 42 | |
| | 41 | 74.1 | 73.4 | 72.6 | 71.9 | 71.1 | 70.4 | 69.6 | 68.8 | 68.1 | 67.3 | 66.5 | 65.7 | 64.9 | 64.1 | 63.3 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | 80.1 | 79.5 | 78.8 | 78.2 | 77.5 | 76.9 | 76.2 | 75.6 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | 80.1 | 79.5 | 78.8 | 78.1 | 77.5 | 76.8 | 76.1 | 75.5 | 48 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | 80.1 | 79.5 | 78.8 | 78.1 | 77.4 | 76.7 | 76.0 | 75.4 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | 80.1 | 79.4 | 78.7 | 78.1 | 77.4 | 76.7 | 76.0 | 75.3 | 46 | |
| 5-32 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | 79.4 | 78.7 | 78.0 | 77.3 | 76.6 | 75.9 | 75.2 | 45 | 6-28 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | 79.4 | 78.7 | 78.0 | 77.3 | 76.5 | 75.8 | 75.1 | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | 79.4 | 78.7 | 77.9 | 77.2 | 76.5 | 75.7 | 75.0 | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | 79.4 | 78.7 | 77.9 | 77.2 | 76.4 | 75.7 | 75.0 | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 78.6 | 77.9 | 77.1 | 76.4 | 75.6 | 74.9 | 41 | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | ... | 78.7 | 78.1 | 77.4 | 76.8 | 76.1 | 75.5 | 74.8 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | ... | 78.7 | 78.1 | 77.4 | 76.7 | 76.1 | 75.4 | 74.7 | 48 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | ... | 78.7 | 78.1 | 77.4 | 76.7 | 76.0 | 75.3 | 74.7 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | ... | 78.7 | 78.0 | 77.3 | 76.6 | 76.0 | 75.3 | 74.6 | 46 | |
| 5-28 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 78.0 | 77.3 | 76.6 | 75.9 | 75.2 | 74.5 | 45 | 6-32 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 78.0 | 77.3 | 76.6 | 75.9 | 75.1 | 74.4 | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 78.0 | 77.3 | 76.5 | 75.8 | 75.1 | 74.4 | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 78.0 | 77.3 | 76.5 | 75.8 | 75.0 | 74.3 | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 77.2 | 76.5 | 75.7 | 75.0 | 74.2 | 41 | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | ... | 78.0 | 77.3 | 76.7 | 76.0 | 75.4 | 74.7 | 74.1 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 77.3 | 76.7 | 76.0 | 75.3 | 74.7 | 74.0 | 49 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 77.3 | 76.7 | 76.0 | 75.3 | 74.6 | 73.9 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 77.3 | 76.6 | 75.9 | 75.3 | 74.6 | 73.9 | 46 | |
| 5-24 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 76.6 | 75.9 | 75.2 | 74.5 | 73.8 | 45 | 6-36 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 76.6 | 75.9 | 75.2 | 74.5 | 73.8 | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 76.6 | 75.9 | 75.1 | 74.4 | 73.7 | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 76.6 | 75.8 | 75.1 | 74.4 | 73.6 | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 75.8 | 75.1 | 74.3 | 73.6 | 41 | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 76.6 | 75.9 | 75.3 | 74.6 | 74.0 | 73.4 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 76.6 | 75.9 | 75.3 | 74.6 | 73.9 | 73.3 | 48 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 75.9 | 75.2 | 74.6 | 73.9 | 73.2 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 75.9 | 75.2 | 74.5 | 73.9 | 73.2 | 46 | |
| 5-20 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 75.9 | 75.2 | 74.5 | 73.8 | 73.1 | 45 | 6-40 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 75.9 | 75.2 | 74.5 | 73.8 | 73.1 | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 75.2 | 74.5 | 73.7 | 73.0 | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 74.4 | 73.7 | 73.0 | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 74.4 | 73.7 | 73.0 | 41 | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 75.2 | 74.5 | 73.9 | 73.3 | 72.6 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 75.2 | 74.5 | 73.9 | 73.2 | 72.6 | 48 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 74.5 | 73.8 | 73.2 | 72.5 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 74.5 | 73.8 | 73.1 | 72.5 | 46 | |
| 5-16 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 74.5 | 73.8 | 73.1 | 72.4 | 45 | 6-44 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.8 | 73.1 | 72.4 | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.1 | 72.4 | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.1 | 72.3 | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.0 | 72.3 | 41 | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.8 | 73.1 | 72.5 | 71.9 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.8 | 73.1 | 72.5 | 71.8 | 48 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.1 | 72.4 | 71.8 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.1 | 72.4 | 71.8 | 46 | |
| 5-12 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 73.1 | 72.4 | 71.7 | 45 | 6-48 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 72.4 | 71.7 | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 72.4 | 71.7 | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.7 | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.7 | 41 | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 72.4 | 71.8 | 71.1 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 72.4 | 71.7 | 71.1 | 48 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 72.3 | 71.7 | 71.1 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.7 | 71.0 | 46 | |
| 5-08 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.7 | 71.0 | 45 | 6-52 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.0 | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.0 | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 41 | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.6 | 71.0 | 70.3 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.0 | 70.3 | 48 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.0 | 70.3 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 70.3 | 46 | |
| 5-04 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 70.3 | 45 | 6-56 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 41 | |
| | 49 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 70.3 | 69.6 | 49 | |
| | 48 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 69.6 | 48 | |
| | 47 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 69.6 | 47 | |
| | 46 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 46 | |
| 5-00 | 45 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 45 | 7-00 |
| | 44 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 44 | |
| | 43 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 43 | |
| | 42 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 42 | |
| | 41 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | | |
| | 49 | 74.9 | 74.2 | 73.6 | 72.9 | 72.3 | 71.6 | 70.9 | 70.2 | 69.6 | 68.8 | 68.2 | 67.5 | 66.8 | 66.1 | 65.3 | 49 | |
| | 48 | 74.8 | 74.1 | 73.4 | 72.8 | 72.1 | 71.4 | 70.7 | 70.0 | 69.3 | 68.6 | 67.9 | 67.2 | 66.5 | 65.8 | 65.1 | 48 | |
| | 47 | 74.7 | 74.0 | 73.3 | 72.6 | 71.9 | 71.2 | 70.5 | 69.8 | 69.1 | 68.4 | 67.7 | 67.0 | 66.3 | 65.5 | 64.8 | 47 | |
| | 46 | 74.6 | 73.9 | 73.2 | 72.5 | 71.8 | 71.1 | 70.4 | 69.7 | 68.9 | 68.2 | 67.5 | 66.7 | 66.0 | 65.3 | 64.5 | 46 | |
| 5-32 | 45 | 74.5 | 73.8 | 73.1 | 72.4 | 71.6 | 70.9 | 70.2 | 69.5 | 68.7 | 68.0 | 67.3 | 66.5 | 65.8 | 65.0 | 64.3 | 45 | 6-28 |
| | 44 | 74.4 | 73.7 | 73.0 | 72.2 | 71.5 | 70.8 | 70.0 | 69.3 | 68.6 | 67.8 | 67.1 | 66.3 | 65.6 | 64.8 | 64.0 | 44 | |
| | 43 | 74.3 | 73.6 | 72.8 | 72.1 | 71.4 | 70.6 | 69.9 | 69.1 | 68.4 | 67.6 | 66.9 | 66.1 | 65.3 | 64.6 | 63.8 | 43 | |
| | 42 | 74.2 | 73.5 | 72.7 | 72.0 | 71.2 | 70.5 | 69.7 | 69.0 | 68.2 | 67.4 | 66.7 | 65.9 | 65.1 | 64.3 | 63.6 | 42 | |
| | 41 | 74.1 | 73.4 | 72.6 | 71.9 | 71.1 | 70.4 | 69.6 | 68.8 | 68.1 | 67.3 | 66.5 | 65.7 | 64.9 | 64.1 | 63.3 | 41 | |
| | 49 | 74.2 | 73.5 | 72.9 | 72.2 | 71.5 | 70.9 | 70.2 | 69.5 | 68.9 | 68.1 | 67.5 | 66.8 | 66.1 | 65.4 | 64.7 | 49 | |
| | 48 | 74.1 | 73.4 | 72.7 | 72.1 | 71.4 | 70.7 | 70.0 | 69.3 | 68.6 | 67.9 | 67.2 | 66.5 | 65.8 | 65.1 | 64.4 | 48 | |
| | 47 | 74.0 | 73.3 | 72.6 | 71.9 | 71.2 | 70.5 | 69.9 | 69.2 | 68.5 | 67.8 | 67.0 | 66.3 | 65.6 | 64.9 | 64.1 | 47 | |
| | 46 | 73.9 | 73.2 | 72.5 | 71.8 | 71.1 | 70.4 | 69.7 | 69.0 | 68.3 | 67.5 | 66.8 | 66.1 | 65.4 | 64.6 | 63.9 | 46 | |
| 5-28 | 45 | 73.8 | 73.1 | 72.4 | 71.7 | 71.0 | 70.3 | 69.5 | 68.8 | 68.1 | 67.3 | 66.6 | 65.9 | 65.1 | 64.4 | 63.7 | 45 | 6-32 |
| | 44 | 73.7 | 73.0 | 72.3 | 71.6 | 70.8 | 70.1 | 69.4 | 68.7 | 67.9 | 67.2 | 66.4 | 65.7 | 64.9 | 64.2 | 63.4 | 44 | |
| | 43 | 73.6 | 72.9 | 72.2 | 71.4 | 70.6 | 70.0 | 69.2 | 68.5 | 67.7 | 67.0 | 66.2 | 65.5 | 64.7 | 64.0 | 63.2 | 43 | |
| | 42 | 73.6 | 72.8 | 72.1 | 71.3 | 70.6 | 69.8 | 69.1 | 68.3 | 67.6 | 66.8 | 66.1 | 65.3 | 64.5 | 63.8 | 63.0 | 42 | |
| | 41 | 73.5 | 72.8 | 72.0 | 71.2 | 70.5 | 69.7 | 69.0 | 68.2 | 67.4 | 66.7 | 65.9 | 65.1 | 64.3 | 63.6 | 62.8 | 41 | |
| | 49 | 73.4 | 72.8 | 72.1 | 71.5 | 70.8 | 70.1 | 69.5 | 68.8 | 68.1 | 67.4 | 66.8 | 66.1 | 65.4 | 64.7 | 64.0 | 49 | |
| | 48 | 73.4 | 72.7 | 72.0 | 71.3 | 70.7 | 70.0 | 69.3 | 68.6 | 67.9 | 67.3 | 66.6 | 65.9 | 65.2 | 64.5 | 63.7 | 48 | |
| | 47 | 73.3 | 72.6 | 71.9 | 71.2 | 70.5 | 69.8 | 69.2 | 68.5 | 67.8 | 67.1 | 66.4 | 65.6 | 64.9 | 64.2 | 63.5 | 47 | |
| | 46 | 73.2 | 72.5 | 71.8 | 71.1 | 70.4 | 69.7 | 69.0 | 68.3 | 67.6 | 66.9 | 66.2 | 65.4 | 64.7 | 64.0 | 63.3 | 46 | |
| 5-24 | 45 | 73.1 | 72.4 | 71.7 | 71.0 | 70.3 | 69.6 | 68.9 | 68.1 | 67.4 | 66.7 | 66.0 | 65.2 | 64.5 | 63.8 | 63.0 | 45 | 6-36 |
| | 44 | 73.0 | 72.3 | 71.6 | 70.9 | 70.2 | 69.5 | 68.7 | 68.0 | 67.3 | 66.5 | 65.8 | 65.1 | 64.3 | 63.6 | 62.8 | 44 | |
| | 43 | 73.0 | 72.2 | 71.5 | 70.8 | 70.1 | 69.3 | 68.6 | 67.9 | 67.1 | 66.4 | 65.6 | 64.9 | 64.1 | 63.4 | 62.6 | 43 | |
| | 42 | 72.9 | 72.2 | 71.4 | 70.7 | 70.0 | 69.2 | 68.5 | 67.7 | 67.0 | 66.2 | 65.4 | 64.7 | 63.9 | 63.2 | 62.4 | 42 | |
| | 41 | 72.9 | 72.1 | 71.4 | 70.6 | 69.9 | 69.1 | 68.3 | 67.6 | 66.8 | 66.1 | 65.3 | 64.5 | 63.7 | 63.0 | 62.2 | 41 | |
| | 49 | 72.7 | 72.0 | 71.4 | 70.7 | 70.1 | 69.4 | 68.8 | 68.1 | 67.4 | 66.7 | 66.1 | 65.4 | 64.7 | 64.0 | 63.3 | 49 | |
| | 48 | 72.6 | 72.0 | 71.3 | 70.6 | 70.0 | 69.3 | 68.6 | 67.9 | 67.3 | 66.6 | 65.9 | 65.2 | 64.5 | 63.8 | 63.1 | 48 | |
| | 47 | 72.5 | 71.9 | 71.2 | 70.5 | 69.8 | 69.2 | 68.5 | 67.8 | 67.1 | 66.4 | 65.7 | 65.0 | 64.3 | 63.6 | 62.9 | 47 | |
| | 46 | 72.5 | 71.8 | 71.1 | 70.4 | 69.7 | 69.0 | 68.3 | 67.6 | 66.9 | 66.2 | 65.5 | 64.8 | 64.1 | 63.3 | 62.6 | 46 | |
| 5-20 | 45 | 72.4 | 71.7 | 71.0 | 70.3 | 69.6 | 68.9 | 68.2 | 67.5 | 66.8 | 66.0 | 65.3 | 64.6 | 63.9 | 63.1 | 62.4 | 45 | 6-40 |
| | 44 | 72.4 | 71.6 | 70.9 | 70.2 | 69.5 | 68.8 | 68.1 | 67.3 | 66.6 | 65.9 | 65.2 | 64.4 | 63.7 | 62.9 | 62.2 | 44 | |
| | 43 | 72.3 | 71.6 | 70.9 | 70.1 | 69.4 | 68.7 | 67.9 | 67.2 | 66.5 | 65.7 | 65.0 | 64.2 | 63.5 | 62.7 | 62.0 | 43 | |
| | 42 | 72.3 | 71.5 | 70.8 | 70.0 | 69.3 | 68.6 | 67.8 | 67.1 | 66.3 | 65.6 | 64.8 | 64.1 | 63.3 | 62.6 | 61.8 | 42 | |
| | 41 | 72.2 | 71.5 | 70.7 | 70.0 | 69.2 | 68.5 | 67.7 | 67.0 | 66.2 | 65.4 | 64.7 | 63.9 | 63.2 | 62.4 | 61.6 | 41 | |
| | 49 | 71.9 | 71.3 | 70.7 | 70.0 | 69.3 | 68.7 | 68.0 | 67.4 | 66.7 | 66.0 | 65.4 | 64.7 | 64.0 | 63.3 | 62.7 | 49 | |
| | 48 | 71.9 | 71.2 | 70.6 | 69.9 | 69.2 | 68.6 | 67.9 | 67.2 | 66.5 | 65.9 | 65.2 | 64.5 | 63.8 | 63.1 | 62.4 | 48 | |
| | 47 | 71.8 | 71.2 | 70.5 | 69.8 | 69.1 | 68.5 | 67.8 | 67.1 | 66.4 | 65.7 | 65.0 | 64.3 | 63.6 | 62.9 | 62.2 | 47 | |
| | 46 | 71.8 | 71.1 | 70.4 | 69.7 | 69.0 | 68.3 | 67.6 | 67.0 | 66.3 | 65.5 | 64.8 | 64.1 | 63.4 | 62.7 | 62.0 | 46 | |
| 5-16 | 45 | 71.7 | 71.0 | 70.3 | 69.6 | 68.9 | 68.2 | 67.5 | 66.8 | 66.1 | 65.4 | 64.7 | 64.0 | 63.2 | 62.5 | 61.8 | 45 | 6-44 |
| | 44 | 71.7 | 71.0 | 70.3 | 69.6 | 68.8 | 68.1 | 67.4 | 66.7 | 66.0 | 65.2 | 64.5 | 63.8 | 63.1 | 62.3 | 61.6 | 44 | |
| | 43 | 71.6 | 70.9 | 70.2 | 69.5 | 68.8 | 68.0 | 67.3 | 66.6 | 65.8 | 65.1 | 64.4 | 63.6 | 62.9 | 62.1 | 61.4 | 43 | |
| | 42 | 71.6 | 70.9 | 70.1 | 69.4 | 68.7 | 67.9 | 67.2 | 66.5 | 65.7 | 65.0 | 64.2 | 63.5 | 62.7 | 62.0 | 61.2 | 42 | |
| | 41 | 71.6 | 70.8 | 70.1 | 69.3 | 68.6 | 67.8 | 67.1 | 66.3 | 65.6 | 64.8 | 64.1 | 63.3 | 62.6 | 61.8 | 61.0 | 41 | |
| | 49 | 71.2 | 70.6 | 69.9 | 69.3 | 68.6 | 68.0 | 67.3 | 66.7 | 66.0 | 65.3 | 64.7 | 64.0 | 63.3 | 62.7 | 62.0 | 49 | |
| | 48 | 71.2 | 70.5 | 69.8 | 69.2 | 68.5 | 67.9 | 67.2 | 66.5 | 65.9 | 65.2 | 64.5 | 63.8 | 63.1 | 62.4 | 61.8 | 48 | |
| | 47 | 71.1 | 70.4 | 69.8 | 69.1 | 68.4 | 67.8 | 67.1 | 66.4 | 65.7 | 65.0 | 64.3 | 63.6 | 62.9 | 62.2 | 61.5 | 47 | |
| | 46 | 71.1 | 70.4 | 69.7 | 69.0 | 68.3 | 67.6 | 67.0 | 66.3 | 65.6 | 64.9 | 64.2 | 63.5 | 62.8 | 62.1 | 61.3 | 46 | |
| 5-12 | 45 | 71.0 | 70.3 | 69.6 | 68.9 | 68.2 | 67.5 | 66.8 | 66.1 | 65.4 | 64.7 | 64.0 | 63.3 | 62.6 | 61.9 | 61.1 | 45 | 6-48 |
| | 44 | 71.0 | 70.3 | 69.6 | 68.9 | 68.2 | 67.5 | 66.7 | 66.0 | 65.3 | 64.6 | 63.9 | 63.1 | 62.4 | 61.7 | 60.9 | 44 | |
| | 43 | 71.0 | 70.3 | 69.5 | 68.8 | 68.1 | 67.4 | 66.6 | 65.9 | 65.2 | 64.5 | 63.7 | 63.0 | 62.3 | 61.5 | 60.7 | 43 | |
| | 42 | 70.9 | 70.2 | 69.5 | 68.8 | 68.0 | 67.3 | 66.6 | 65.8 | 65.1 | 64.3 | 63.6 | 62.9 | 62.1 | 61.4 | 60.6 | 42 | |
| | 41 | 70.9 | 70.2 | 69.4 | 68.7 | 68.0 | 67.2 | 66.5 | 65.7 | 65.0 | 64.2 | 63.5 | 62.7 | 62.0 | 61.2 | 60.4 | 41 | |
| | 49 | 70.5 | 69.8 | 69.2 | 68.6 | 67.9 | 67.2 | 66.6 | 65.9 | 65.3 | 64.6 | 64.0 | 63.3 | 62.6 | 62.0 | 61.3 | 49 | |
| | 48 | 70.4 | 69.8 | 69.1 | 68.5 | 67.8 | 67.1 | 66.5 | 65.8 | 65.2 | 64.5 | 63.8 | 63.1 | 62.5 | 61.8 | 61.1 | 48 | |
| | 47 | 70.4 | 69.7 | 69.1 | 68.4 | 67.7 | 67.1 | 66.4 | 65.7 | 65.0 | 64.3 | 63.7 | 63.0 | 62.3 | 61.6 | 60.9 | 47 | |
| | 46 | 70.4 | 69.7 | 69.0 | 68.3 | 67.6 | 67.0 | 66.3 | 65.6 | 64.9 | 64.2 | 63.5 | 62.8 | 62.1 | 61.4 | 60.7 | 46 | |
| 5-08 | 45 | 70.3 | 69.6 | 68.9 | 68.3 | 67.6 | 66.9 | 66.2 | 65.5 | 64.8 | 64.1 | 63.4 | 62.7 | 61.9 | 61.2 | 60.5 | 45 | 6-52 |
| | 44 | 70.3 | 69.6 | 68.9 | 68.2 | 67.5 | 66.8 | 66.1 | 65.4 | 64.6 | 64.0 | 63.2 | 62.5 | 61.8 | 61.1 | 60.3 | 44 | |
| | 43 | 70.3 | 69.6 | 68.8 | 68.1 | 67.4 | 66.7 | 66.0 | 65.3 | 64.5 | 63.9 | 63.1 | 62.4 | 61.6 | 60.9 | 60.2 | 43 | |
| | 42 | 70.3 | 69.5 | 68.8 | 68.1 | 67.3 | 66.6 | 65.9 | 65.2 | 64.4 | 63.8 | 63.0 | 62.2 | 61.5 | 60.7 | 60.0 | 42 | |
| | 41 | 70.2 | 69.5 | 68.8 | 68.0 | 67.3 | 66.6 | 65.8 | 65.1 | 64.4 | 63.7 | 62.9 | 62.1 | 61.4 | 60.6 | 59.9 | 41 | |
| | 49 | 69.7 | 69.1 | 68.5 | 67.8 | 67.2 | 66.5 | 65.9 | 65.2 | 64.6 | 63.9 | 63.3 | 62.6 | 62.0 | 61.3 | 60.6 | 49 | |
| | 48 | 69.7 | 69.0 | 68.4 | 67.7 | 67.1 | 66.4 | 65.8 | 65.1 | 64.5 | 63.8 | 63.1 | 62.5 | 61.8 | 61.1 | 60.4 | 48 | |
| | 47 | 69.7 | 69.0 | 68.3 | 67.7 | 67.0 | 66.3 | 65.7 | 65.0 | 64.3 | 63.7 | 63.0 | 62.3 | 61.6 | 60.9 | 60.2 | 47 | |
| | 46 | 69.6 | 69.0 | 68.3 | 67.6 | 66.9 | 66.3 | 65.6 | 64.9 | 64.2 | 63.5 | 62.8 | 62.1 | 61.4 | 60.8 | 60.1 | 46 | |
| 5-04 | 45 | 69.6 | 68.9 | 68.2 | 67.6 | 66.9 | 66.2 | 65.5 | 64.8 | 64.1 | 63.4 | 62.7 | 62.0 | 61.3 | 60.6 | 59.9 | 45 | 6-56 |
| | 44 | 69.6 | 68.9 | 68.2 | 67.5 | 66.8 | 66.1 | 65.4 | 64.7 | 64.0 | 63.3 | 62.6 | 61.9 | 61.1 | 60.4 | 59.7 | 44 | |
| | 43 | 69.6 | 68.9 | 68.2 | 67.5 | 66.8 | 66.1 | 65.3 | 64.6 | 63.9 | 63.2 | 62.5 | 61.7 | 61.0 | 60.3 | 59.6 | 43 | |
| | 42 | .... | 68.9 | 68.2 | 67.4 | 66.7 | 66.0 | 65.3 | 64.5 | 63.8 | 63.1 | 62.3 | 61.6 | 60.9 | 60.1 | 59.4 | 42 | |
| | 41 | .... | 68.9 | 68.1 | 67.4 | 66.7 | 65.9 | 65.2 | 64.5 | 63.7 | 63.0 | 62.2 | 61.5 | 60.8 | 60.0 | 59.3 | 41 | |
| | 49 | 69.0 | 68.3 | 67.7 | 67.1 | 66.4 | 65.8 | 65.2 | 64.5 | 63.9 | 63.2 | 62.6 | 61.9 | 61.3 | 60.6 | 59.9 | 49 | |
| | 48 | 69.0 | 68.3 | 67.7 | 67.0 | 66.3 | 65.7 | 65.1 | 64.4 | 63.8 | 63.1 | 62.5 | 61.8 | 61.1 | 60.4 | 59.8 | 48 | |
| | 47 | 69.0 | 68.3 | 67.6 | 67.0 | 66.3 | 65.6 | 65.0 | 64.3 | 63.7 | 63.0 | 62.3 | 61.6 | 60.9 | 60.2 | 59.6 | 47 | |
| | 46 | 68.9 | 68.3 | 67.6 | 66.9 | 66.2 | 65.6 | 64.9 | 64.2 | 63.6 | 62.8 | 62.1 | 61.4 | 60.8 | 60.1 | 59.4 | 46 | |
| 5-00 | 45 | 68.9 | 68.2 | 67.5 | 66.9 | 66.2 | 65.5 | 64.8 | 64.1 | 63.4 | 62.7 | 62.0 | 61.3 | 60.6 | 59.9 | 59.2 | 45 | 7-00 |
| | 44 | .... | 68.2 | 67.5 | 66.8 | 66.1 | 65.4 | 64.7 | 64.0 | 63.3 | 62.6 | 61.9 | 61.1 | 60.4 | 59.8 | 59.1 | 44 | |
| | 43 | .... | 68.2 | 67.5 | 66.8 | 66.1 | 65.4 | 64.7 | 64.0 | 63.2 | 62.5 | 61.7 | 61.0 | 60.3 | 59.7 | 58.9 | 43 | |
| | 42 | .... | .... | 67.5 | 66.8 | 66.0 | 65.3 | 64.6 | 63.9 | 63.1 | 62.3 | 61.6 | 60.9 | 60.1 | 59.5 | 58.8 | 42 | |
| | 41 | .... | .... | 67.5 | 66.7 | 66.0 | 65.3 | 64.6 | 63.8 | 63.0 | 62.2 | 61.5 | 60.8 | 60.0 | 59.4 | 58.7 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A.M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 70.3 | 69.6 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 69.6 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 69.6 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 5-00 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 7-00 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 68.9 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 4-56 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 7-04 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 4 52 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 7-08 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
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| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
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| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
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| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
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| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
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| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
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| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 69.0 | 68.3 | 67.7 | 67.1 | 66.4 | 65.8 | 65.2 | 64.5 | 63.9 | 63.2 | 62.6 | 61.9 | 61.3 | 60.6 | 59.9 | 49 | |
| | 48 | 69.0 | 68.3 | 67.7 | 67.0 | 66.3 | 65.7 | 65.1 | 64.4 | 63.8 | 63.1 | 62.5 | 61.8 | 61.1 | 60.4 | 59.8 | 48 | |
| | 47 | 69.0 | 68.3 | 67.6 | 67.0 | 66.3 | 65.6 | 65.0 | 64.3 | 63.7 | 63.0 | 62.3 | 61.6 | 60.9 | 60.2 | 59.6 | 47 | |
| | 46 | 68.9 | 68.3 | 67.6 | 66.9 | 66.2 | 65.6 | 64.9 | 64.2 | 63.6 | 62.8 | 62.1 | 61.4 | 60.8 | 60.1 | 59.4 | 46 | |
| 5-00 | 45 | 68.9 | 68.2 | 67.5 | 66.9 | 66.2 | 65.5 | 64.8 | 64.1 | 63.4 | 62.7 | 62.0 | 61.3 | 60.6 | 59.9 | 59.2 | 45 | 7-00 |
| | 44 | .... | 68.2 | 67.5 | 66.8 | 66.1 | 65.4 | 64.7 | 64.0 | 63.3 | 62.6 | 61.9 | 61.1 | 60.4 | 59.8 | 59.1 | 44 | |
| | 43 | .... | 68.2 | 67.5 | 66.8 | 66.1 | 65.4 | 64.7 | 64.0 | 63.2 | 62.5 | 61.7 | 61.0 | 60.3 | 59.7 | 58.9 | 43 | |
| | 42 | .... | .... | 67.5 | 66.8 | 66.0 | 65.3 | 64.6 | 63.9 | 63.1 | 62.3 | 61.6 | 60.9 | 60.1 | 59.5 | 58.8 | 42 | |
| | 41 | .... | .... | 67.5 | 66.7 | 66.0 | 65.3 | 64.6 | 63.8 | 63.0 | 62.2 | 61.5 | 60.8 | 60.0 | 59.4 | 58.7 | 41 | |
| | 49 | 68.2 | 67.6 | 67.0 | 66.3 | 65.7 | 65.1 | 64.4 | 63.8 | 63.2 | 62.5 | 61.9 | 61.2 | 60.5 | 59.9 | 59.3 | 49 | |
| | 48 | 68.2 | 67.6 | 66.9 | 66.3 | 65.6 | 65.0 | 64.3 | 63.7 | 63.0 | 62.4 | 61.7 | 61.1 | 60.4 | 59.7 | 59.1 | 48 | |
| | 47 | 68.2 | 67.6 | 66.9 | 66.2 | 65.6 | 64.9 | 64.3 | 63.6 | 62.9 | 62.3 | 61.6 | 60.9 | 60.3 | 59.6 | 58.9 | 47 | |
| | 46 | .... | 67.5 | 66.9 | 66.2 | 65.5 | 64.9 | 64.2 | 63.5 | 62.8 | 62.2 | 61.5 | 60.8 | 60.1 | 59.4 | 58.7 | 46 | |
| 4-56 | 45 | .... | 67.5 | 66.8 | 66.2 | 65.5 | 64.8 | 64.1 | 63.4 | 62.8 | 62.1 | 61.4 | 60.7 | 60.0 | 59.3 | 58.6 | 45 | 7-04 |
| | 44 | .... | .... | 66.8 | 66.1 | 65.4 | 64.8 | 64.1 | 63.4 | 62.7 | 62.0 | 61.3 | 60.6 | 59.9 | 59.2 | 58.4 | 44 | |
| | 43 | .... | .... | 66.8 | 66.1 | 65.4 | 64.7 | 64 0 | 63.3 | 62.6 | 61.9 | 61.2 | 60.5 | 59.7 | 59.0 | 58.3 | 43 | |
| | 42 | .... | .... | .... | 66.1 | 65.4 | 64.7 | 64.0 | 63.2 | 62.5 | 61.8 | 61.1 | 60.4 | 59.6 | 58.9 | 58.2 | 42 | |
| | 41 | .... | .... | .... | 66.1 | 65.3 | 64.6 | 63.9 | 63.2 | 62.5 | 61.7 | 61.0 | 60.3 | 59.5 | 58.8 | 58.1 | 41 | |
| | 49 | 67.5 | 66.9 | 66.2 | 65.6 | 65.0 | 64.3 | 63.7 | 63.1 | 62.4 | 61.8 | 61.2 | 60.5 | 59.9 | 59.2 | 58.6 | 49 | |
| | 48 | 67.5 | 66.8 | 66.2 | 65.6 | 64.9 | 64.3 | 63.6 | 63.0 | 62.3 | 61.7 | 61.0 | 60.4 | 59.7 | 59.1 | 58.4 | 48 | |
| | 47 | .... | 66.8 | 66.2 | 65.5 | 64.9 | 64.2 | 63.6 | 62.9 | 62.2 | 61.6 | 60.9 | 60.3 | 59.6 | 58.9 | 58.2 | 47 | |
| | 46 | .... | 66.8 | 66.2 | 65.5 | 64.8 | 64.2 | 63.5 | 62.8 | 62.2 | 61.5 | 60.8 | 60.1 | 59.5 | 58.8 | 58.1 | 46 | |
| 4-52 | 45 | .... | .... | 66.2 | 65.5 | 64.8 | 64.1 | 63.4 | 62.7 | 62.1 | 61.4 | 60.7 | 60.0 | 59.3 | 58.6 | 58.0 | 45 | 7-08 |
| | 44 | .... | .... | 66.1 | 65.4 | 64.7 | 64.1 | 63.4 | 62.7 | 62.0 | 61.3 | 60.6 | 59.9 | 59.2 | 58.5 | 57.8 | 44 | |
| | 43 | .... | .... | .... | 65.4 | 64.7 | 64.0 | 63.3 | 62.6 | 61.9 | 61.2 | 60.5 | 59.8 | 59.1 | 58.4 | 57.7 | 43 | |
| | 42 | .... | .... | .... | .... | 64.7 | 64.0 | 63.3 | 62.6 | 61.9 | 61.2 | 60.4 | 59.7 | 59.0 | 58.3 | 57.6 | 42 | |
| | 41 | .... | .... | .... | .... | 64.7 | 64.0 | 63.3 | 62.5 | 61.8 | 61.1 | 60.4 | 59.7 | 58.9 | 58.2 | 57.5 | 41 | |
| | 49 | .... | 66.1 | 65.5 | 64.9 | 64.2 | 63.6 | 63.0 | 62.3 | 61.7 | 61.1 | 60.5 | 59.8 | 59.2 | 58.5 | 57.9 | 49 | |
| | 48 | .... | 66.1 | 65.4 | 64.8 | 64.2 | 63.5 | 62.9 | 62.3 | 61.6 | 61.0 | 60.3 | 59.7 | 59.0 | 58.4 | 57.7 | 48 | |
| | 47 | .... | .... | 65.4 | 64.8 | 64.1 | 63.5 | 62.8 | 62.2 | 61.5 | 60.9 | 60.2 | 59.6 | 58.9 | 58.2 | 57.6 | 47 | |
| | 46 | .... | .... | 65.4 | 64.8 | 64.1 | 63.5 | 62.8 | 62.1 | 61.5 | 60.8 | 60.1 | 59.5 | 58.8 | 58.1 | 57.4 | 46 | |
| 4-48 | 45 | .... | .... | .... | 64.8 | 64.1 | 63.4 | 62.7 | 62.1 | 61.4 | 60.7 | 60.0 | 59.4 | 58.7 | 58.0 | 57.3 | 45 | 7-12 |
| | 44 | .... | .... | .... | 64.8 | 64.1 | 63.4 | 62.7 | 62.0 | 61.3 | 60.6 | 60.0 | 59.2 | 58.6 | 57.9 | 57.2 | 44 | |
| | 43 | .... | .... | .... | .... | 64.1 | 63.4 | 62.7 | 62.0 | 61.3 | 60.6 | 59.9 | 59.2 | 58.5 | 57.8 | 57.1 | 43 | |
| | 42 | .... | .... | .... | .... | .... | 63.4 | 62.6 | 61.9 | 61.2 | 60.5 | 59.8 | 59.1 | 58.4 | 57.7 | 57.0 | 42 | |
| | 41 | .... | .... | .... | .... | .... | 63.3 | 62.6 | 61.9 | 61.2 | 60.5 | 59.7 | 59.0 | 58.3 | 57.6 | 56.9 | 41 | |
| | 49 | .... | 65.4 | 64.7 | 64.1 | 63.5 | 62.9 | 62.2 | 61.6 | 61.0 | 60.4 | 59.7 | 59.1 | 58.5 | 57.8 | 57.2 | 49 | |
| | 48 | .... | .... | 64.7 | 64.1 | 63.4 | 62.8 | 62.2 | 61.6 | 60.9 | 60.3 | 59.6 | 59.0 | 58.3 | 57.7 | 57.1 | 48 | |
| | 47 | .... | .... | 64.7 | 64.1 | 63.4 | 62.8 | 62.1 | 61.5 | 60.8 | 60.2 | 59.5 | 58.9 | 58.2 | 57.6 | 56.9 | 47 | |
| | 46 | .... | .... | .... | 64.1 | 63.4 | 62.7 | 62.1 | 61.4 | 60.8 | 60.1 | 59.4 | 58.8 | 58.1 | 57.4 | 56.8 | 46 | |
| 4-44 | 45 | .... | .... | .... | .... | 63.4 | 62.7 | 62.1 | 61.4 | 60.7 | 60.0 | 59.4 | 58.7 | 58.0 | 57.3 | 56.7 | 45 | 7-16 |
| | 44 | .... | .... | .... | .... | 63.4 | 62.7 | 62.0 | 61.3 | 60.7 | 60.0 | 59.3 | 58.6 | 57.9 | 57.2 | 56.6 | 44 | |
| | 43 | .... | .... | .... | .... | .... | 62.7 | 62.0 | 61.3 | 60.6 | 59.9 | 59.2 | 58.5 | 57.8 | 57.1 | 56.4 | 43 | |
| | 42 | .... | .... | .... | .... | .... | 62.7 | 62.0 | 61.3 | 60.6 | 59.9 | 59.2 | 58.5 | 57.8 | 57.0 | 56.3 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | 62.0 | 61.3 | 60.5 | 59.9 | 59.1 | 58.4 | 57.7 | 57.0 | 56.2 | 41 | |
| | 49 | .... | .... | 64.0 | 63.4 | 62.7 | 62.1 | 61.5 | 60.9 | 60.3 | 59.6 | 59.0 | 58.4 | 57.8 | 57.1 | 56.5 | 49 | |
| | 48 | .... | .... | .... | 63.4 | 62.7 | 62.1 | 61.5 | 60.8 | 60.2 | 59.6 | 58.9 | 58.3 | 57.7 | 57.0 | 56.4 | 48 | |
| | 47 | .... | .... | .... | 63.3 | 62.7 | 62.1 | 61.4 | 60.8 | 60.1 | 59.5 | 58.8 | 58.2 | 57.5 | 56.9 | 56.2 | 47 | |
| | 46 | .... | .... | .... | .... | 62.7 | 62.0 | 61.4 | 60.7 | 60.1 | 59.4 | 58.8 | 58.1 | 57.4 | 56.8 | 56.1 | 46 | |
| 4-40 | 45 | .... | .... | .... | .... | 62.7 | 62.0 | 61.4 | 60.7 | 60.0 | 59.4 | 58.7 | 58.0 | 57.3 | 56.7 | 56.0 | 45 | 7-20 |
| | 44 | .... | .... | .... | .... | .... | 62.0 | 61.3 | 60.7 | 60.0 | 59.3 | 58.6 | 57.9 | 57.3 | 56.6 | 55.9 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | 61.3 | 60.6 | 59.9 | 59.3 | 58.6 | 57.9 | 57.2 | 56.5 | 55.8 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | 61.3 | 60.6 | 59.9 | 59.2 | 58.5 | 57.8 | 57.1 | 56.4 | 55.7 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | 60.6 | 59.9 | 59.2 | 58.5 | 57.8 | 57.1 | 56.3 | 55.7 | 41 | |
| | 49 | .... | .... | .... | 62.6 | 62.0 | 61.4 | 60.8 | 60.2 | 59.5 | 58.9 | 58.3 | 57.7 | 57.1 | 56.4 | 55.9 | 49 | |
| | 48 | .... | .... | .... | 62.6 | 62.0 | 61.4 | 60.7 | 60.1 | 59.5 | 58.9 | 58.2 | 57.6 | 57.0 | 56.3 | 55.7 | 48 | |
| | 47 | .... | .... | .... | .... | 62.0 | 61.3 | 60.7 | 60.1 | 59.4 | 58.8 | 58.1 | 57.5 | 56.9 | 56.2 | 55.6 | 47 | |
| | 46 | .... | .... | .... | .... | .... | 61.3 | 60.7 | 60.0 | 59.4 | 58.7 | 58.1 | 57.4 | 56.8 | 56.1 | 55.4 | 46 | |
| 4-36 | 45 | .... | .... | .... | .... | .... | 61.3 | 60.7 | 60.0 | 59.3 | 58.7 | 58.0 | 57.3 | 56.7 | 56.0 | 55.3 | 45 | 7-24 |
| | 44 | .... | .... | .... | .... | .... | .... | 60.6 | 60.0 | 59.3 | 58.6 | 58.0 | 57.3 | 56.6 | 55.9 | 55.2 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | 60.0 | 59.3 | 58.6 | 57.9 | 57.2 | 56.5 | 55.8 | 55.2 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | 60.0 | 59.3 | 58.6 | 57.9 | 57.2 | 56.5 | 55.7 | 55.1 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | 59.2 | 58.5 | 57.8 | 57.1 | 56.4 | 55.7 | 55.0 | 41 | |
| | 49 | .... | .... | .... | .... | 61.3 | 60.7 | 60.0 | 59.4 | 58.8 | 58.2 | 57.6 | 57.0 | 56.3 | 55.7 | 55.1 | 49 | |
| | 48 | .... | .... | .... | .... | 61.2 | 60.6 | 60.0 | 59.4 | 58.8 | 58.1 | 57.5 | 56.9 | 56.3 | 55.6 | 55.0 | 48 | |
| | 47 | .... | .... | .... | .... | .... | 60.6 | 60.0 | 59.3 | 58.7 | 58.1 | 57.4 | 56.8 | 56.2 | 55.5 | 54.9 | 47 | |
| | 46 | .... | .... | .... | .... | .... | 60.6 | 60.0 | 59.3 | 58.7 | 58.0 | 57.4 | 56.7 | 56.1 | 55.4 | 54.8 | 46 | |
| 4-32 | 45 | .... | .... | .... | .... | .... | .... | 60.0 | 59.3 | 58.6 | 58.0 | 57.3 | 56.7 | 56.0 | 55.3 | 54.7 | 45 | 7-28 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | 59.3 | 58.6 | 58.0 | 57.3 | 56.6 | 55.9 | 55.3 | 54.6 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | 59.3 | 58.6 | 57.9 | 57.2 | 56.6 | 55.9 | 55.2 | 54.5 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | 58.6 | 57.9 | 57.2 | 56.5 | 55.8 | 55.1 | 54.5 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 57.9 | 57.2 | 56.5 | 55.8 | 55.1 | 54.4 | 41 | |
| | 49 | .... | .... | .... | .... | 60.5 | 59.9 | 59.3 | 58.7 | 58.1 | 57.5 | 56.9 | 56.3 | 55.7 | 55.0 | 54.4 | 49 | |
| | 48 | .... | .... | .... | .... | .... | 59.9 | 59.3 | 58.7 | 58.0 | 57.4 | 56.8 | 56.2 | 55.6 | 54.9 | 54.3 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | 59.3 | 58.6 | 58.0 | 57.4 | 56.7 | 56.1 | 55.5 | 54.8 | 54.2 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | 59.2 | 58.6 | 58.0 | 57.3 | 56.7 | 56.0 | 55.4 | 54.8 | 54.1 | 46 | |
| 4-28 | 45 | .... | .... | .... | .... | .... | .... | .... | 58.6 | 57.9 | 57.3 | 56.6 | 56.0 | 55.3 | 54.7 | 54.0 | 45 | 7-32 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | 57.9 | 57.3 | 56.6 | 55.9 | 55.3 | 54.6 | 53.9 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 57.2 | 56.6 | 55.9 | 55.2 | 54.6 | 53.9 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 57.2 | 56.6 | 55.9 | 55.2 | 54.5 | 53.8 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 56.5 | 55.8 | 55.2 | 54.5 | 53.8 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | .... | .... | .... | .... | 60.5 | 59.9 | 59.3 | 58.7 | 58.1 | 57.5 | 56.9 | 56.3 | 55.7 | 55.0 | 54.4 | 49 | |
| | 48 | .... | .... | .... | .... | .... | 59.9 | 59.3 | 58.7 | 58.0 | 57.4 | 56.8 | 56.2 | 55.6 | 54.9 | 54.3 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | 59.3 | 58.6 | 58.0 | 57.4 | 56.7 | 56.1 | 55.5 | 54.8 | 54.2 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | 59.2 | 58.6 | 58.0 | 57.3 | 56.7 | 56.0 | 55.4 | 54.8 | 54.1 | 46 | |
| 4-28 | 45 | .... | .... | .... | .... | .... | .... | .... | 58.6 | 57.9 | 57.3 | 56.6 | 56.0 | 55.3 | 54.7 | 54.0 | 45 | 7-32 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | 57.9 | 57.3 | 56.6 | 55.9 | 55.3 | 54.6 | 53.9 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 57.2 | 56.6 | 55.9 | 55.2 | 54.6 | 53.9 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 57.2 | 56.6 | 55.9 | 55.2 | 54.5 | 53.8 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 56.5 | 55.8 | 55.2 | 54.5 | 53.8 | 41 | |
| | 49 | .... | .... | .... | .... | .... | 59.2 | 58.5 | 57.9 | 57.3 | 56.7 | 56.1 | 55.5 | 54.9 | 54.3 | 53.7 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | 58.5 | 57.9 | 57.3 | 56.7 | 56.1 | 55.5 | 54.9 | 54.2 | 53.6 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | 58.5 | 57.9 | 57.3 | 56.7 | 56.0 | 55.4 | 54.8 | 54.2 | 53.5 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | 57.9 | 57.3 | 56.6 | 56.0 | 55.4 | 54.7 | 54.1 | 53.4 | 46 | |
| 4-24 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | 57.2 | 56.6 | 56.0 | 55.3 | 54.7 | 54.0 | 53.4 | 45 | 7-36 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 56.6 | 55.9 | 55.3 | 54.6 | 53.9 | 53.3 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 56.6 | 55.9 | 55.2 | 54.6 | 53.9 | 53.2 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 55.9 | 55.2 | 54.5 | 53.9 | 53.2 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 55.2 | 54.5 | 53.8 | 53.1 | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | 57.8 | 57.2 | 56.6 | 56.0 | 55.4 | 54.8 | 54.2 | 53.6 | 53.0 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | 57.8 | 57.2 | 56.6 | 56.0 | 55.4 | 54.8 | 54.1 | 53.5 | 52.9 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | 57.2 | 56.6 | 55.9 | 55.3 | 54.7 | 54.1 | 53.5 | 52.8 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | 56.5 | 55.9 | 55.3 | 54.6 | 54.0 | 53.4 | 52.8 | 46 | |
| 4-20 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 55.9 | 55.3 | 54.6 | 54.0 | 53.3 | 52.7 | 45 | 7-40 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 55.9 | 55.2 | 54.6 | 53.9 | 53.3 | 52.6 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 55.2 | 54.6 | 53.9 | 53.2 | 52.6 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 54.6 | 53.9 | 53.2 | 52.5 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.9 | 53.2 | 52.5 | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | 57.0 | 56.5 | 55.9 | 55.3 | 54.7 | 54.1 | 53.5 | 52.9 | 52.3 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | 56.5 | 55.8 | 55.2 | 54.6 | 54.0 | 53.4 | 52.8 | 52.2 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | 55.8 | 55.2 | 54.6 | 54.0 | 53.4 | 52.8 | 52.1 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 55.2 | 54.6 | 54.0 | 53.3 | 52.7 | 52.1 | 46 | |
| 4-16 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 55.2 | 54.6 | 53.9 | 53.3 | 52.6 | 52.0 | 45 | 7-44 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 54.6 | 53.9 | 53.3 | 52.6 | 52.0 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.9 | 53.2 | 52.6 | 51.9 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.2 | 52.5 | 51.9 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.2 | 52.5 | 51.9 | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | 55.7 | 55.1 | 54.5 | 54.0 | 53.4 | 52.8 | 52.2 | 51.6 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | 55.1 | 54.5 | 53.9 | 53.3 | 52.7 | 52.1 | 51.5 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 54.5 | 53.9 | 53.3 | 52.7 | 52.1 | 51.4 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 54.5 | 53.9 | 53.2 | 52.6 | 52.0 | 51.4 | 46 | |
| 4-12 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.9 | 53.2 | 52.6 | 52.0 | 51.3 | 45 | 7-48 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.2 | 52.6 | 51.9 | 51.3 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 52.6 | 51.9 | 51.3 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 52.6 | 51.9 | 51.2 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.9 | 51.2 | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | 54.4 | 53.8 | 63.2 | 62.6 | 62.1 | 61.5 | 50.9 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | 54.4 | 53.8 | 53.2 | 52.6 | 52.0 | 51.4 | 50.8 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.8 | 53.2 | 52.6 | 52.0 | 51.4 | 50.8 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.2 | 52.5 | 51.9 | 51.3 | 50.7 | 46 | |
| 4-08 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 52.5 | 51.9 | 51.3 | 50.7 | 45 | 7-52 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.9 | 51.3 | 50.6 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.9 | 51.2 | 50.6 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.2 | 50.6 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 50.6 | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | 53.6 | 53.0 | 52.5 | 51.9 | 51.3 | 50.7 | 50.2 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 53.0 | 52.5 | 51.9 | 51.3 | 50.7 | 50.1 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 52.4 | 51.9 | 51.2 | 50.6 | 50.1 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.8 | 51.2 | 50.6 | 50.0 | 46 | |
| 4-04 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.8 | 51.2 | 50.6 | 50.0 | 45 | 7-56 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.2 | 50.6 | 49.9 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 50.6 | 49.9 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.9 | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 52.3 | 51.7 | 51.2 | 50.6 | 50.0 | 49.4 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.7 | 51.1 | 50.6 | 50.0 | 49.4 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.1 | 50.5 | 49.9 | 49.4 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.1 | 50.5 | 49.9 | 49.3 | 46 | |
| 4-00 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 50.5 | 49.9 | 49.3 | 45 | 8-00 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.9 | 49.3 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.2 | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.0 | 50.4 | 49.9 | 49.3 | 48.7 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.0 | 50.4 | 49.8 | 49.3 | 48.7 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 50.4 | 49.8 | 49.2 | 48.7 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.8 | 49.2 | 48.6 | 46 | |
| 3-56 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.2 | 48.6 | 45 | 8-04 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48.6 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.0 | 50.4 | 49.9 | 49.3 | 48.7 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 51.0 | 50.4 | 49.8 | 49.3 | 48.7 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 50.4 | 49.8 | 49.2 | 48.7 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.8 | 49.2 | 48.6 | 46 | |
| 3-56 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.2 | 48.6 | 45 | 8-04 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48.6 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 50.2 | 49.7 | 49.1 | 48.6 | 48.0 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.7 | 49.1 | 48.5 | 48.0 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49.1 | 48.5 | 47.9 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48.5 | 47.9 | 46 | |
| 3-52 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47.9 | 45 | 8-08 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47.9 | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48.9 | 48.4 | 47.8 | 47.3 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48.4 | 47.8 | 47.2 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47.8 | 47.2 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47.8 | 47.2 | 46 | |
| 3-48 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47.2 | 45 | 8-12 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48.2 | 47.6 | 47.1 | 46.5 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47.6 | 47.1 | 46.5 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47.1 | 46.5 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46.5 | 46 | |
| 3-44 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 8-16 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46.9 | 46.3 | 45.8 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46.3 | 45.8 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45.8 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 3-40 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 8-20 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45.6 | 45.1 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45.6 | 45.1 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45.1 | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 3-36 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 8-24 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44.8 | 44.3 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44.3 | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 3-32 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 8-28 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43.6 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 3-28 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 8-32 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42.8 | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 3-24 | 45 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 8-36 |
| | 44 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# PART II

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.9 | 178.9 | 178.9 | 178.9 | 178.9 | 49 | |
| | 48 | 178.7 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.9 | 178.9 | 178.9 | 178.9 | 48 | |
| | 47 | 178.6 | 178.7 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.9 | 178.9 | 178.9 | 47 | |
| | 46 | 178.6 | 178.6 | 178.7 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.9 | 178.9 | 46 | |
| 11-56 | 45 | 178.6 | 178.6 | 178.6 | 178.7 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.9 | 178.9 | 45 | 0-04 |
| | 44 | 178.6 | 178.6 | 178.6 | 178.6 | 178.7 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.9 | 44 | |
| | 43 | 178.5 | 178.6 | 178.6 | 178.6 | 178.6 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 43 | |
| | 42 | 178.5 | 178.5 | 178.6 | 178.6 | 178.6 | 178.7 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 178.8 | 42 | |
| | 41 | 178.5 | 178.5 | 178.5 | 178.6 | 178.6 | 178.6 | 178.6 | 178.7 | 178.7 | 178.7 | 178.7 | 178.8 | 178.8 | 178.8 | 178.8 | 41 | |
| | 49 | 177.4 | 177.4 | 177.4 | 177.5 | 177.5 | 177.5 | 177.6 | 177.6 | 177.6 | 177.7 | 177.7 | 177.7 | 177.8 | 177.8 | 177.8 | 49 | |
| | 48 | 177.3 | 177.3 | 177.4 | 177.4 | 177.5 | 177.5 | 177.5 | 177.6 | 177.6 | 177.6 | 177.7 | 177.7 | 177.7 | 177.8 | 177.8 | 48 | |
| | 47 | 177.3 | 177.3 | 177.4 | 177.4 | 177.4 | 177.5 | 177.5 | 177.5 | 177.6 | 177.6 | 177.6 | 177.7 | 177.7 | 177.7 | 177.8 | 47 | |
| | 46 | 177.2 | 177.3 | 177.3 | 177.4 | 177.4 | 177.4 | 177.5 | 177.5 | 177.5 | 177.6 | 177.6 | 177.7 | 177.7 | 177.7 | 177.8 | 46 | |
| 11-52 | 45 | 177.2 | 177.2 | 177.3 | 177.3 | 177.4 | 177.4 | 177.4 | 177.5 | 177.5 | 177.6 | 177.6 | 177.6 | 177.7 | 177.7 | 177.7 | 45 | 0-08 |
| | 44 | 177.1 | 177.2 | 177.2 | 177.3 | 177.3 | 177.4 | 177.4 | 177.4 | 177.5 | 177.5 | 177.6 | 177.6 | 177.6 | 177.7 | 177.7 | 44 | |
| | 43 | 177.1 | 177.1 | 177.2 | 177.2 | 177.3 | 177.3 | 177.4 | 177.4 | 177.5 | 177.5 | 177.5 | 177.6 | 177.6 | 177.6 | 177.7 | 43 | |
| | 42 | 177.0 | 177.1 | 177.1 | 177.2 | 177.2 | 177.3 | 177.3 | 177.4 | 177.4 | 177.5 | 177.5 | 177.5 | 177.6 | 177.6 | 177.7 | 42 | |
| | 41 | 177.0 | 177.0 | 177.1 | 177.1 | 177.2 | 177.2 | 177.3 | 177.3 | 177.4 | 177.4 | 177.5 | 177.5 | 177.5 | 177.6 | 177.6 | 41 | |
| | 49 | 176.0 | 176.1 | 176.1 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 176.5 | 176.5 | 176.6 | 176.6 | 176.7 | 176.7 | 176.7 | 49 | |
| | 48 | 176.0 | 176.0 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 176.5 | 176.5 | 176.6 | 176.6 | 176.7 | 176.7 | 48 | |
| | 47 | 175.9 | 176.0 | 176.0 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 176.5 | 176.5 | 176.6 | 176.6 | 176.7 | 47 | |
| | 46 | 175.8 | 175.9 | 176.0 | 176.0 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 176.5 | 176.5 | 176.6 | 176.6 | 46 | |
| 11-48 | 45 | 175.8 | 175.8 | 175.9 | 176.0 | 176.0 | 176.1 | 176.2 | 176.2 | 176.3 | 176.4 | 176.4 | 176.5 | 176.5 | 176.6 | 176.6 | 45 | 0-12 |
| | 44 | 175.7 | 175.8 | 175.8 | 175.9 | 176.0 | 176.1 | 176.1 | 176.2 | 176.2 | 176.3 | 176.4 | 176.4 | 176.5 | 176.5 | 176.6 | 44 | |
| | 43 | 175.6 | 175.7 | 175.8 | 175.8 | 175.9 | 176.0 | 176.1 | 176.1 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 176.5 | 176.5 | 43 | |
| | 42 | 175.5 | 175.6 | 175.7 | 175.8 | 175.8 | 175.9 | 176.0 | 176.1 | 176.1 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 176.5 | 42 | |
| | 41 | 175.4 | 175.5 | 175.6 | 175.7 | 175.8 | 175.9 | 175.9 | 176.0 | 176.1 | 176.1 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 41 | |
| | 49 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.1 | 175.1 | 175.2 | 175.3 | 175.3 | 175.4 | 175.5 | 175.5 | 175.6 | 175.7 | 49 | |
| | 48 | 174.6 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.1 | 175.2 | 175.2 | 175.3 | 175.3 | 175.5 | 175.5 | 175.6 | 175.6 | 48 | |
| | 47 | 174.5 | 174.6 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.1 | 175.2 | 175.2 | 175.3 | 175.4 | 175.4 | 175.5 | 175.6 | 47 | |
| | 46 | 174.5 | 174.5 | 174.6 | 174.7 | 174.8 | 174.9 | 175.0 | 175.0 | 175.1 | 175.2 | 175.3 | 175.3 | 175.4 | 175.5 | 175.5 | 46 | |
| 11-44 | 45 | 174.3 | 174.5 | 174.6 | 174.6 | 174.7 | 174.8 | 174.9 | 175.0 | 175.1 | 175.1 | 175.2 | 175.3 | 175.3 | 175.4 | 175.5 | 45 | 0-16 |
| | 44 | 174.3 | 174.4 | 174.5 | 174.5 | 174.6 | 174.7 | 174.8 | 174.9 | 175.0 | 175.1 | 175.1 | 175.2 | 175.3 | 175.4 | 175.4 | 44 | |
| | 43 | 174.1 | 174.3 | 174.4 | 174.5 | 174.6 | 174.7 | 174.7 | 174.8 | 174.9 | 175.0 | 175.1 | 175.1 | 175.2 | 175.3 | 175.4 | 43 | |
| | 42 | 174.0 | 174.1 | 174.3 | 174.4 | 174.5 | 174.6 | 174.7 | 174.7 | 174.8 | 174.9 | 175.0 | 175.1 | 175.2 | 175.3 | 175.3 | 42 | |
| | 41 | 173.9 | 174.1 | 174.2 | 174.3 | 174.4 | 174.5 | 174.6 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.1 | 175.3 | 175.3 | 41 | |
| | 49 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 174.3 | 174.3 | 174.4 | 174.5 | 174.6 | 49 | |
| | 48 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.0 | 174.1 | 174.2 | 174.3 | 174.4 | 174.4 | 174.5 | 48 | |
| | 47 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.1 | 174.2 | 174.3 | 174.4 | 174.5 | 47 | |
| | 46 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 174.2 | 174.3 | 174.4 | 46 | |
| 11-40 | 45 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 174.3 | 174.4 | 45 | 0-20 |
| | 44 | 172.8 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 174.3 | 44 | |
| | 43 | 172.7 | 172.8 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.7 | 173.8 | 173.9 | 174.0 | 174.0 | 174.1 | 174.2 | 43 | |
| | 42 | 172.6 | 172.7 | 172.8 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 42 | |
| | 41 | 172.4 | 172.6 | 172.7 | 172.8 | 173.0 | 173.1 | 173.2 | 173.3 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 41 | |
| | 49 | 172.1 | 172.2 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 49 | |
| | 48 | 172.0 | 172.1 | 172.2 | 172.3 | 172.4 | 172.5 | 172.6 | 172.8 | 172.9 | 173.0 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 48 | |
| | 47 | 171.8 | 172.0 | 172.1 | 172.2 | 172.3 | 172.4 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 47 | |
| | 46 | 171.7 | 171.8 | 172.0 | 172.1 | 172.2 | 172.3 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 46 | |
| 11-36 | 45 | 171.5 | 171.7 | 171.8 | 172.0 | 172.1 | 172.2 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 45 | 0-24 |
| | 44 | 171.4 | 171.6 | 171.7 | 171.8 | 172.0 | 172.1 | 172.2 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.1 | 173.2 | 44 | |
| | 43 | 171.2 | 171.4 | 171.6 | 171.7 | 171.9 | 172.0 | 172.1 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 172.9 | 173.0 | 173.1 | 43 | |
| | 42 | 171.1 | 171.2 | 171.4 | 171.6 | 171.7 | 171.9 | 172.0 | 172.1 | 172.3 | 172.4 | 172.5 | 172.7 | 172.8 | 172.9 | 173.0 | 42 | |
| | 41 | 170.9 | 171.1 | 171.3 | 171.4 | 171.6 | 171.7 | 171.9 | 172.0 | 172.2 | 172.3 | 172.4 | 172.6 | 172.7 | 172.8 | 172.9 | 41 | |
| | 49 | 170.8 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.5 | 171.7 | 171.8 | 171.9 | 172.0 | 172.1 | 172.2 | 172.3 | 172.4 | 49 | |
| | 48 | 170.6 | 170.8 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.6 | 171.7 | 171.8 | 171.9 | 172.0 | 172.1 | 172.2 | 172.3 | 48 | |
| | 47 | 170.5 | 170.6 | 170.8 | 170.9 | 171.1 | 171.2 | 171.3 | 171.5 | 171.6 | 171.7 | 171.8 | 171.9 | 172.0 | 172.1 | 172.3 | 47 | |
| | 46 | 170.3 | 170.5 | 170.6 | 170.8 | 170.9 | 171.1 | 171.2 | 171.3 | 171.5 | 171.6 | 171.7 | 171.8 | 171.9 | 172.1 | 172.2 | 46 | |
| 11-32 | 45 | 170.2 | 170.3 | 170.5 | 170.6 | 170.8 | 170.9 | 171.1 | 171.2 | 171.4 | 171.5 | 171.6 | 171.7 | 171.9 | 172.0 | 172.1 | 45 | 0-28 |
| | 44 | 170.0 | 170.2 | 170.3 | 170.5 | 170.6 | 170.8 | 170.9 | 171.1 | 171.2 | 171.4 | 171.5 | 171.6 | 171.8 | 171.9 | 172.0 | 44 | |
| | 43 | 169.8 | 170.0 | 170.2 | 170.3 | 170.5 | 170.7 | 170.8 | 171.0 | 171.1 | 171.3 | 171.4 | 171.5 | 171.7 | 171.8 | 171.9 | 43 | |
| | 42 | 169.6 | 169.8 | 170.0 | 170.2 | 170.4 | 170.5 | 170.7 | 170.8 | 171.0 | 171.1 | 171.3 | 171.4 | 171.6 | 171.7 | 171.8 | 42 | |
| | 41 | 169.4 | 169.6 | 169.8 | 170.0 | 170.2 | 170.4 | 170.5 | 170.7 | 170.9 | 171.0 | 171.2 | 171.3 | 171.5 | 171.6 | 171.7 | 41 | |
| | 49 | 169.5 | 169.6 | 169.8 | 169.9 | 170.1 | 170.2 | 170.3 | 170.5 | 170.6 | 170.7 | 170.9 | 171.0 | 171.1 | 171.2 | 171.3 | 49 | |
| | 48 | 169.3 | 169.5 | 169.6 | 169.8 | 169.9 | 170.1 | 170.2 | 170.4 | 170.5 | 170.6 | 170.7 | 170.9 | 171.0 | 171.1 | 171.2 | 48 | |
| | 47 | 169.1 | 169.3 | 169.5 | 169.6 | 169.8 | 169.9 | 170.1 | 170.2 | 170.4 | 170.5 | 170.6 | 170.8 | 170.9 | 171.0 | 171.2 | 47 | |
| | 46 | 169.0 | 169.1 | 169.3 | 169.5 | 169.6 | 169.8 | 170.0 | 170.1 | 170.3 | 170.4 | 170.5 | 170.7 | 170.8 | 170.9 | 171.1 | 46 | |
| 11-28 | 45 | 168.8 | 169.0 | 169.1 | 169.3 | 169.5 | 169.7 | 169.8 | 170.0 | 170.1 | 170.3 | 170.4 | 170.6 | 170.7 | 170.9 | 171.0 | 45 | 0-32 |
| | 44 | 168.6 | 168.8 | 169.0 | 169.1 | 169.3 | 169.5 | 169.7 | 169.8 | 170.0 | 170.2 | 170.3 | 170.5 | 170.6 | 170.8 | 170.9 | 44 | |
| | 43 | 168.4 | 168.6 | 168.8 | 169.0 | 169.2 | 169.4 | 169.5 | 169.7 | 169.9 | 170.0 | 170.2 | 170.3 | 170.5 | 170.6 | 170.8 | 43 | |
| | 42 | 168.1 | 168.4 | 168.6 | 168.8 | 169.0 | 169.2 | 169.4 | 169.5 | 169.7 | 169.9 | 170.1 | 170.2 | 170.4 | 170.5 | 170.7 | 42 | |
| | 41 | 167.9 | 168.2 | 168.4 | 168.6 | 168.8 | 169.0 | 169.2 | 169.4 | 169.6 | 169.8 | 169.9 | 170.1 | 170.3 | 170.4 | 170.6 | 41 | |
| | 49 | 168.2 | 168.3 | 168.5 | 168.7 | 168.8 | 169.0 | 169.1 | 169.3 | 169.4 | 169.6 | 169.7 | 169.9 | 170.0 | 170.1 | 170.2 | 49 | |
| | 48 | 168.0 | 168.2 | 168.3 | 168.5 | 168.7 | 168.8 | 169.0 | 169.2 | 169.3 | 169.5 | 169.6 | 169.7 | 169.9 | 170.0 | 170.2 | 48 | |
| | 47 | 167.8 | 168.0 | 168.2 | 168.3 | 168.5 | 168.7 | 168.9 | 169.0 | 169.2 | 169.3 | 169.5 | 169.6 | 169.8 | 169.9 | 170.1 | 47 | |
| | 46 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.5 | 168.7 | 168.9 | 169.1 | 169.2 | 169.4 | 169.5 | 169.7 | 169.8 | 170.0 | 46 | |
| 11-24 | 45 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.6 | 168.7 | 168.9 | 169.1 | 169.3 | 169.4 | 169.6 | 169.7 | 169.9 | 45 | 0-36 |
| | 44 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.6 | 168.8 | 168.9 | 169.1 | 169.3 | 169.4 | 169.6 | 169.8 | 44 | |
| | 43 | 166.9 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.6 | 168.8 | 169.0 | 169.2 | 169.3 | 169.5 | 169.7 | 43 | |
| | 42 | 166.7 | 166.9 | 167.2 | 167.4 | 167.6 | 167.8 | 168.1 | 168.3 | 168.5 | 168.6 | 168.8 | 169.0 | 169.2 | 169.4 | 169.5 | 42 | |
| | 41 | 166.4 | 166.7 | 166.9 | 167.2 | 167.4 | 167.7 | 167.9 | 168.1 | 168.3 | 168.5 | 168.7 | 168.9 | 169.1 | 169.2 | 169.4 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 179.1 | 179.1 | 179.1 | 49 | |
| | 48 | 178.9 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 179.1 | 179.1 | 179.1 | 48 | |
| | 47 | 178.9 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 179.1 | 179.1 | 47 | |
| | 46 | 178.9 | 178.9 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 179.1 | 179.1 | 46 | |
| 11-56 | 45 | 178.9 | 178.9 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 179.1 | 45 | 0-04 |
| | 44 | 178.9 | 178.9 | 178.9 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 179.1 | 44 | |
| | 43 | 178.9 | 178.9 | 178.9 | 178.9 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 179.1 | 43 | |
| | 42 | 178.9 | 178.9 | 178.9 | 178.9 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 42 | |
| | 41 | 178.8 | 178.9 | 178.9 | 178.9 | 178.9 | 178.9 | 178.9 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.0 | 179.1 | 179.1 | 41 | |
| | 49 | 177.8 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 178.1 | 178.2 | 178.2 | 178.2 | 49 | |
| | 48 | 177.8 | 177.9 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 178.1 | 178.2 | 178.2 | 178.2 | 48 | |
| | 47 | 177.8 | 177.8 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 178.1 | 178.2 | 178.2 | 47 | |
| | 46 | 177.8 | 177.8 | 177.9 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 178.1 | 178.2 | 178.2 | 46 | |
| 11-52 | 45 | 177.8 | 177.8 | 177.8 | 177.9 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 178.2 | 178.2 | 45 | 0-08 |
| | 44 | 177.7 | 177.8 | 177.8 | 177.8 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 178.1 | 178.2 | 44 | |
| | 43 | 177.7 | 177.8 | 177.8 | 177.8 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 178.2 | 43 | |
| | 42 | 177.7 | 177.7 | 177.8 | 177.8 | 177.8 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 178.2 | 42 | |
| | 41 | 177.7 | 177.7 | 177.7 | 177.8 | 177.8 | 177.8 | 177.9 | 177.9 | 177.9 | 178.0 | 178.0 | 178.0 | 178.1 | 178.1 | 178.1 | 41 | |
| | 49 | 176.8 | 176.8 | 176.9 | 176.9 | 177.0 | 177.0 | 177.0 | 177.1 | 177.1 | 177.1 | 177.2 | 177.2 | 177.2 | 177.3 | 177.3 | 49 | |
| | 48 | 176.8 | 176.8 | 176.8 | 176.9 | 176.9 | 177.0 | 177.0 | 177.0 | 177.1 | 177.1 | 177.2 | 177.2 | 177.2 | 177.3 | 177.3 | 48 | |
| | 47 | 176.7 | 176.8 | 176.8 | 176.9 | 176.9 | 176.9 | 177.0 | 177.0 | 177.1 | 177.1 | 177.1 | 177.2 | 177.2 | 177.3 | 177.3 | 47 | |
| | 46 | 176.7 | 176.7 | 176.8 | 176.8 | 176.9 | 176.9 | 177.0 | 177.0 | 177.0 | 177.1 | 177.1 | 177.2 | 177.2 | 177.2 | 177.3 | 46 | |
| 11-48 | 45 | 176.7 | 176.7 | 176.8 | 176.8 | 176.9 | 176.9 | 176.9 | 177.0 | 177.0 | 177.1 | 177.1 | 177.1 | 177.2 | 177.2 | 177.3 | 45 | 0-12 |
| | 44 | 176.6 | 176.7 | 176.7 | 176.8 | 176.8 | 176.9 | 176.9 | 177.0 | 177.0 | 177.0 | 177.1 | 177.1 | 177.2 | 177.2 | 177.3 | 44 | |
| | 43 | 176.6 | 176.6 | 176.7 | 176.7 | 176.8 | 176.8 | 176.9 | 176.9 | 177.0 | 177.0 | 177.1 | 177.1 | 177.2 | 177.2 | 177.2 | 43 | |
| | 42 | 176.5 | 176.6 | 176.7 | 176.7 | 176.8 | 176.8 | 176.9 | 176.9 | 177.0 | 177.0 | 177.0 | 177.1 | 177.1 | 177.2 | 177.2 | 42 | |
| | 41 | 176.5 | 176.6 | 176.6 | 176.7 | 176.7 | 176.8 | 176.8 | 176.9 | 176.9 | 177.0 | 177.0 | 177.1 | 177.1 | 177.2 | 177.2 | 41 | |
| | 49 | 175.7 | 175.8 | 175.8 | 175.9 | 175.9 | 176.0 | 176.0 | 176.1 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 49 | |
| | 48 | 175.7 | 175.7 | 175.8 | 175.8 | 175.9 | 175.9 | 176.0 | 176.1 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 176.4 | 176.4 | 48 | |
| | 47 | 175.6 | 175.7 | 175.7 | 175.8 | 175.9 | 175.9 | 176.0 | 176.0 | 176.1 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 176.4 | 47 | |
| | 46 | 175.6 | 175.7 | 175.7 | 175.8 | 175.8 | 175.9 | 175.9 | 176.0 | 176.1 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 176.4 | 46 | |
| 11-44 | 45 | 175.5 | 175.6 | 175.7 | 175.7 | 175.8 | 175.9 | 175.9 | 176.0 | 176.0 | 176.1 | 176.1 | 176.2 | 176.3 | 176.3 | 176.4 | 45 | 0-16 |
| | 44 | 175.5 | 175.6 | 175.6 | 175.7 | 175.8 | 175.8 | 175.9 | 175.9 | 176.0 | 176.1 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 44 | |
| | 43 | 175.5 | 175.5 | 175.6 | 175.7 | 175.7 | 175.8 | 175.9 | 175.9 | 176.0 | 176.0 | 176.1 | 176.2 | 176.2 | 176.3 | 176.3 | 43 | |
| | 42 | 175.4 | 175.5 | 175.5 | 175.6 | 175.7 | 175.7 | 175.8 | 175.9 | 175.9 | 176.0 | 176.1 | 176.1 | 176.2 | 176.2 | 176.3 | 42 | |
| | 41 | 175.3 | 175.4 | 175.5 | 175.6 | 175.6 | 175.7 | 175.8 | 175.8 | 175.9 | 176.0 | 176.0 | 176.1 | 176.2 | 176.1 | 176.3 | 41 | |
| | 49 | 174.6 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.0 | 175.1 | 175.2 | 175.2 | 175.3 | 175.4 | 175.4 | 175.5 | 175.5 | 49 | |
| | 48 | 174.6 | 174.7 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.1 | 175.1 | 175.2 | 175.3 | 175.3 | 175.4 | 175.5 | 175.5 | 48 | |
| | 47 | 174.5 | 174.6 | 174.7 | 174.8 | 174.8 | 174.9 | 175.0 | 175.0 | 175.1 | 175.2 | 175.2 | 175.3 | 175.4 | 175.4 | 175.5 | 47 | |
| | 46 | 174.5 | 174.6 | 174.6 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.1 | 175.2 | 175.2 | 175.3 | 175.4 | 175.4 | 175.5 | 46 | |
| 11-40 | 45 | 174.4 | 174.5 | 174.6 | 174.7 | 174.8 | 174.8 | 174.9 | 175.0 | 175.0 | 175.1 | 175.2 | 175.3 | 175.3 | 175.4 | 175.5 | 45 | 0-20 |
| | 44 | 174.4 | 174.5 | 174.5 | 174.6 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.1 | 175.2 | 175.2 | 175.3 | 175.4 | 175.4 | 44 | |
| | 43 | 174.3 | 174.4 | 174.5 | 174.6 | 174.7 | 174.7 | 174.8 | 174.9 | 175.0 | 175.0 | 175.1 | 175.2 | 175.3 | 175.3 | 175.4 | 43 | |
| | 42 | 174.3 | 174.3 | 174.4 | 174.5 | 174.6 | 174.7 | 174.8 | 174.9 | 174.9 | 175.0 | 175.1 | 175.2 | 175.2 | 175.3 | 175.4 | 42 | |
| | 41 | 174.2 | 174.3 | 174.4 | 174.5 | 174.6 | 174.6 | 174.7 | 174.8 | 174.9 | 175.0 | 175.1 | 175.2 | 175.2 | 175.0 | 175.4 | 41 | |
| | 49 | 173.6 | 173.7 | 173.7 | 173.8 | 173.9 | 174.0 | 174.0 | 174.1 | 174.2 | 174.3 | 174.3 | 174.4 | 174.5 | 174.6 | 174.6 | 49 | |
| | 48 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 173.9 | 174.0 | 174.1 | 174.2 | 174.2 | 174.3 | 174.4 | 174.5 | 174.5 | 174.6 | 48 | |
| | 47 | 173.5 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.1 | 174.2 | 174.3 | 174.4 | 174.4 | 174.5 | 174.6 | 47 | |
| | 46 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 174.3 | 174.3 | 174.4 | 174.5 | 174.6 | 46 | |
| 11-36 | 45 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.1 | 174.2 | 174.3 | 174.4 | 174.5 | 174.5 | 45 | 0-24 |
| | 44 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 174.3 | 174.4 | 174.4 | 174.5 | 44 | |
| | 43 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.1 | 174.2 | 174.3 | 174.4 | 174.5 | 43 | |
| | 42 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 174.3 | 174.4 | 174.5 | 42 | |
| | 41 | 173.0 | 173.1 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.8 | 173.9 | 174.0 | 174.1 | 174.2 | 174.2 | 174.3 | 174.4 | 41 | |
| | 49 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 173.7 | 49 | |
| | 48 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.6 | 173.7 | 48 | |
| | 47 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 47 | |
| | 46 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 173.7 | 46 | |
| 11-32 | 45 | 172.2 | 172.3 | 172.4 | 172.5 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.5 | 173.6 | 45 | 0-28 |
| | 44 | 172.1 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 44 | |
| | 43 | 172.1 | 172.2 | 172.3 | 172.4 | 172.5 | 172.6 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 173.6 | 43 | |
| | 42 | 172.0 | 172.1 | 172.2 | 172.3 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 42 | |
| | 41 | 171.9 | 172.0 | 172.1 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 172.9 | 173.0 | 173.1 | 173.2 | 173.3 | 173.4 | 173.5 | 41 | |
| | 49 | 171.4 | 171.6 | 171.7 | 171.8 | 171.9 | 172.0 | 172.1 | 172.2 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 172.9 | 49 | |
| | 48 | 171.4 | 171.5 | 171.6 | 171.7 | 171.8 | 171.9 | 172.0 | 172.1 | 172.2 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 48 | |
| | 47 | 171.3 | 171.4 | 171.5 | 171.6 | 171.7 | 171.9 | 172.0 | 172.1 | 172.2 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 47 | |
| | 46 | 171.2 | 171.3 | 171.4 | 171.6 | 171.7 | 171.8 | 171.9 | 172.0 | 172.1 | 172.2 | 172.4 | 172.5 | 172.6 | 172.7 | 172.8 | 46 | |
| 11-28 | 45 | 171.1 | 171.2 | 171.4 | 171.5 | 171.6 | 171.7 | 171.8 | 172.0 | 172.1 | 172.2 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 45 | 0-32 |
| | 44 | 171.0 | 171.2 | 171.3 | 171.4 | 171.6 | 171.7 | 171.8 | 171.9 | 172.0 | 172.1 | 172.3 | 172.4 | 172.5 | 172.6 | 172.7 | 44 | |
| | 43 | 170.9 | 171.1 | 171.2 | 171.3 | 171.5 | 171.6 | 171.7 | 171.9 | 172.0 | 172.1 | 172.2 | 172.3 | 172.4 | 172.5 | 172.7 | 43 | |
| | 42 | 170.8 | 171.0 | 171.1 | 171.3 | 171.4 | 171.5 | 171.7 | 171.8 | 171.9 | 172.0 | 172.1 | 172.3 | 172.4 | 172.5 | 172.6 | 42 | |
| | 41 | 170.7 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.6 | 171.7 | 171.8 | 172.0 | 172.1 | 172.2 | 172.3 | 172.5 | 172.6 | 41 | |
| | 49 | 170.4 | 170.5 | 170.6 | 170.7 | 170.9 | 171.0 | 171.1 | 171.2 | 171.3 | 171.4 | 171.5 | 171.6 | 171.8 | 171.9 | 172.0 | 49 | |
| | 48 | 170.3 | 170.4 | 170.5 | 170.7 | 170.8 | 170.9 | 171.0 | 171.1 | 171.3 | 171.4 | 171.5 | 171.6 | 171.7 | 171.8 | 171.9 | 48 | |
| | 47 | 170.2 | 170.3 | 170.5 | 170.6 | 170.7 | 170.9 | 171.0 | 171.1 | 171.2 | 171.3 | 171.4 | 171.6 | 171.7 | 171.8 | 171.9 | 47 | |
| | 46 | 170.1 | 170.2 | 170.4 | 170.5 | 170.7 | 170.8 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.5 | 171.6 | 171.8 | 171.9 | 46 | |
| 11-24 | 45 | 170.0 | 170.2 | 170.3 | 170.4 | 170.6 | 170.7 | 170.8 | 171.0 | 171.1 | 171.2 | 171.3 | 171.5 | 171.6 | 171.7 | 171.8 | 45 | 0-36 |
| | 44 | 169.9 | 170.1 | 170.2 | 170.4 | 170.5 | 170.6 | 170.8 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.5 | 171.7 | 171.8 | 44 | |
| | 43 | 169.8 | 170.0 | 170.1 | 170.3 | 170.4 | 170.6 | 170.7 | 170.8 | 171.0 | 171.1 | 171.2 | 171.4 | 171.5 | 171.6 | 171.8 | 43 | |
| | 42 | 169.7 | 169.9 | 170.0 | 170.2 | 170.3 | 170.5 | 170.6 | 170.8 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.6 | 171.7 | 42 | |
| | 41 | 169.6 | 169.7 | 169.9 | 170.1 | 170.2 | 170.4 | 170.5 | 170.7 | 170.8 | 171.0 | 171.1 | 171.2 | 171.4 | 171.5 | 171.7 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 168.2 | 168.3 | 168.5 | 168.7 | 168.8 | 169.0 | 169.1 | 169.3 | 169.4 | 169.6 | 169.7 | 169.9 | 170.0 | 170.1 | 170.2 | 49 | |
| | 48 | 168.0 | 168.2 | 168.3 | 168.5 | 168.7 | 168.8 | 169.0 | 169.2 | 169.3 | 169.5 | 169.6 | 169.7 | 169.9 | 170.0 | 170.2 | 48 | |
| | 47 | 167.8 | 168.0 | 168.2 | 168.3 | 168.5 | 168.7 | 168.9 | 169.0 | 169.2 | 169.3 | 169.5 | 169.6 | 169.8 | 169.9 | 170.1 | 47 | |
| | 46 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.5 | 168.7 | 168.9 | 169.1 | 169.2 | 169.4 | 169.5 | 169.7 | 169.8 | 170.0 | 46 | |
| 11-24 | 45 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.6 | 168.7 | 168.9 | 169.1 | 169.3 | 169.4 | 169.6 | 169.7 | 169.9 | 45 | 0-36 |
| | 44 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.6 | 168.8 | 168.9 | 169.1 | 169.3 | 169.4 | 169.6 | 169.8 | 44 | |
| | 43 | 166.9 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.6 | 168.8 | 169.0 | 169.2 | 169.3 | 169.5 | 169.7 | 43 | |
| | 42 | 166.7 | 166.9 | 167.2 | 167.4 | 167.6 | 167.8 | 168.1 | 168.3 | 168.5 | 168.6 | 168.8 | 169.0 | 169.2 | 169.4 | 169.5 | 42 | |
| | 41 | 166.4 | 166.7 | 166.9 | 167.2 | 167.4 | 167.7 | 167.9 | 168.1 | 168.3 | 168.5 | 168.7 | 168.9 | 169.1 | 169.2 | 169.4 | 41 | |
| | 49 | 166.9 | 167.1 | 167.2 | 167.4 | 167.6 | 167.8 | 167.9 | 168.1 | 168.3 | 168.4 | 168.6 | 168.7 | 168.9 | 169.0 | 169.2 | 49 | |
| | 48 | 166.7 | 166.9 | 167.1 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 168.1 | 168.3 | 168.5 | 168.6 | 168.8 | 168.9 | 169.1 | 48 | |
| | 47 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.6 | 167.8 | 168.0 | 168.2 | 168.3 | 168.5 | 168.7 | 168.8 | 169.0 | 47 | |
| | 46 | 166.2 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.7 | 167.9 | 168.0 | 168.2 | 168.4 | 168.5 | 168.7 | 168.9 | 46 | |
| 11-20 | 45 | 166.0 | 166.2 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.7 | 167.9 | 168.1 | 168.2 | 168.4 | 168.6 | 168.8 | 45 | 0-40 |
| | 44 | 165.8 | 166.0 | 166.3 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.7 | 167.9 | 168.1 | 168.3 | 168.5 | 168.7 | 44 | |
| | 43 | 165.5 | 165.8 | 166.0 | 166.3 | 166.5 | 166.7 | 166.9 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.3 | 168.5 | 43 | |
| | 42 | 165.2 | 165.5 | 165.8 | 166.0 | 166.3 | 166.5 | 166.8 | 167.0 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 42 | |
| | 41 | 165.0 | 165.2 | 165.5 | 165.8 | 166.1 | 166.3 | 166.5 | 166.8 | 167.0 | 167.2 | 167.4 | 167.7 | 167.9 | 168.1 | 168.3 | 41 | |
| | 49 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.6 | 167.8 | 167.9 | 168.1 | 49 | |
| | 48 | 165.3 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.1 | 167.3 | 167.5 | 167.7 | 167.8 | 168.0 | 48 | |
| | 47 | 165.1 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.2 | 167.4 | 167.5 | 167.7 | 167.9 | 47 | |
| | 46 | 164.9 | 165.1 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.5 | 166.7 | 166.9 | 167.0 | 167.2 | 167.4 | 167.6 | 167.8 | 46 | |
| 11-16 | 45 | 164.7 | 164.9 | 165.1 | 165.4 | 165.6 | 165.8 | 166.1 | 166.3 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.6 | 45 | 0-44 |
| | 44 | 164.4 | 164.7 | 164.9 | 165.2 | 165.4 | 165.6 | 165.9 | 166.1 | 166.3 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 44 | |
| | 43 | 164.1 | 164.4 | 164.7 | 164.9 | 165.2 | 165.4 | 165.7 | 165.9 | 166.1 | 166.3 | 166.6 | 166.8 | 167.0 | 167.2 | 167.4 | 43 | |
| | 42 | 163.8 | 164.1 | 164.4 | 164.7 | 164.9 | 165.2 | 165.4 | 165.7 | 165.9 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.2 | 42 | |
| | 41 | 163.5 | 163.8 | 164.1 | 164.4 | 164.7 | 165.0 | 165.2 | 165.5 | 165.7 | 166.0 | 166.2 | 166.4 | 166.7 | 166.9 | 167.1 | 41 | |
| | 49 | 164.3 | 164.5 | 164.7 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.1 | 166.3 | 166.5 | 166.7 | 166.9 | 167.0 | 49 | |
| | 48 | 164.0 | 164.3 | 164.5 | 164.7 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.7 | 166.9 | 48 | |
| | 47 | 163.8 | 164.1 | 164.3 | 164.5 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 47 | |
| | 46 | 163.6 | 163.8 | 164.1 | 164.3 | 164.6 | 164.8 | 165.0 | 165.2 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.5 | 166.7 | 46 | |
| 11-12 | 45 | 163.3 | 163.6 | 163.8 | 164.1 | 164.3 | 164.6 | 164.8 | 165.1 | 165.3 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.5 | 45 | 0-48 |
| | 44 | 163.0 | 163.3 | 163.6 | 163.8 | 164.1 | 164.4 | 164.6 | 164.9 | 165.1 | 165.3 | 165.5 | 165.8 | 166.0 | 166.2 | 166.4 | 44 | |
| | 43 | 162.7 | 163.0 | 163.3 | 163.6 | 163.9 | 164.1 | 164.4 | 164.7 | 164.9 | 165.1 | 165.4 | 165.6 | 165.8 | 166.0 | 166.3 | 43 | |
| | 42 | 162.4 | 162.7 | 163.0 | 163.3 | 163.6 | 163.9 | 164.2 | 164.4 | 164.7 | 164.9 | 165.2 | 165.4 | 165.7 | 165.9 | 166.1 | 42 | |
| | 41 | 162.1 | 162.4 | 162.7 | 163.0 | 163.3 | 163.6 | 163.9 | 164.2 | 164.5 | 164.7 | 165.0 | 165.2 | 165.5 | 165.7 | 165.9 | 41 | |
| | 49 | 163.0 | 163.2 | 163.5 | 163.7 | 163.9 | 164.2 | 164.4 | 164.6 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 49 | |
| | 48 | 162.7 | 163.0 | 163.2 | 163.5 | 163.7 | 164.0 | 164.2 | 164.4 | 164.6 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 48 | |
| | 47 | 162.5 | 162.8 | 163.0 | 163.3 | 163.5 | 163.8 | 164.0 | 164.2 | 164.5 | 164.7 | 164.9 | 165.1 | 165.3 | 165.5 | 165.7 | 47 | |
| | 46 | 162.2 | 162.5 | 162.8 | 163.1 | 163.3 | 163.6 | 163.8 | 164.0 | 164.3 | 164.5 | 164.7 | 164.9 | 165.2 | 165.4 | 165.6 | 46 | |
| 11-08 | 45 | 161.9 | 162.2 | 162.5 | 162.8 | 163.1 | 163.3 | 163.6 | 163.8 | 164.1 | 164.3 | 164.6 | 164.8 | 165.0 | 165.2 | 165.4 | 45 | 0-52 |
| | 44 | 161.6 | 161.9 | 162.2 | 162.5 | 162.8 | 163.1 | 163.4 | 163.6 | 163.9 | 164.1 | 164.4 | 164.6 | 164.8 | 165.1 | 165.3 | 44 | |
| | 43 | 161.3 | 161.6 | 162.0 | 162.3 | 162.6 | 162.9 | 163.1 | 163.4 | 163.7 | 163.9 | 164.2 | 164.4 | 164.7 | 164.9 | 165.1 | 43 | |
| | 42 | 161.0 | 161.3 | 161.7 | 162.0 | 162.3 | 162.6 | 162.9 | 163.2 | 163.4 | 163.7 | 164.0 | 164.2 | 164.5 | 164.7 | 165.0 | 42 | |
| | 41 | 160.6 | 161.0 | 161.3 | 161.7 | 162.0 | 162.3 | 162.6 | 162.9 | 163.2 | 163.5 | 163.8 | 164.0 | 164.3 | 164.6 | 164.8 | 41 | |
| | 49 | 161.7 | 162.0 | 162.2 | 162.5 | 162.7 | 163.0 | 163.2 | 163.4 | 163.7 | 163.9 | 164.1 | 164.3 | 164.5 | 164.7 | 164.9 | 49 | |
| | 48 | 161.5 | 161.7 | 162.0 | 162.3 | 162.5 | 162.8 | 163.0 | 163.2 | 163.5 | 163.7 | 163.9 | 164.1 | 164.3 | 164.6 | 164.8 | 48 | |
| | 47 | 161.2 | 161.5 | 161.8 | 162.0 | 162.3 | 162.6 | 162.8 | 163.0 | 163.3 | 163.5 | 163.8 | 164.0 | 164.2 | 164.4 | 164.6 | 47 | |
| | 46 | 160.9 | 161.2 | 161.5 | 161.8 | 162.1 | 162.3 | 162.6 | 162.8 | 163.1 | 163.3 | 163.6 | 163.8 | 164.0 | 164.3 | 164.5 | 46 | |
| 11-04 | 45 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 162.1 | 162.4 | 162.6 | 162.9 | 163.1 | 163.4 | 163.6 | 163.9 | 164.1 | 164.3 | 45 | 0-56 |
| | 44 | 160.3 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 162.1 | 162.4 | 162.7 | 162.9 | 163.2 | 163.5 | 163.7 | 163.9 | 164.2 | 44 | |
| | 43 | 159.9 | 160.3 | 160.6 | 160.9 | 161.3 | 161.6 | 161.9 | 162.2 | 162.5 | 162.7 | 163.0 | 163.3 | 163.5 | 163.8 | 164.0 | 43 | |
| | 42 | 159.6 | 159.9 | 160.3 | 160.6 | 161.0 | 161.3 | 161.6 | 161.9 | 162.2 | 162.5 | 162.8 | 163.1 | 163.3 | 163.6 | 163.8 | 42 | |
| | 41 | 159.2 | 159.6 | 159.9 | 160.3 | 160.7 | 161.0 | 161.3 | 161.6 | 161.9 | 162.3 | 162.5 | 162.8 | 163.1 | 163.5 | 163.7 | 41 | |
| | 49 | 160.5 | 160.7 | 161.0 | 161.3 | 161.5 | 161.8 | 162.0 | 162.3 | 162.5 | 162.7 | 163.0 | 163.2 | 163.4 | 163.6 | 163.8 | 49 | |
| | 48 | 160.2 | 160.5 | 160.3 | 161.0 | 161.3 | 161.6 | 161.8 | 162.1 | 162.3 | 162.6 | 162.8 | 163.0 | 163.3 | 163.5 | 163.7 | 48 | |
| | 47 | 159.9 | 160.2 | 160.5 | 160.8 | 161.1 | 161.3 | 161.6 | 161.9 | 162.1 | 162.4 | 162.6 | 162.9 | 163.1 | 163.3 | 163.6 | 47 | |
| | 46 | 159.6 | 159.9 | 160.2 | 160.5 | 160.8 | 161.1 | 161.4 | 161.7 | 161.9 | 162.2 | 162.4 | 162.7 | 162.9 | 163.2 | 163.4 | 46 | |
| 11-00 | 45 | 159.3 | 159.6 | 159.9 | 160.2 | 160.5 | 160.8 | 161.1 | 161.4 | 161.7 | 162.0 | 162.2 | 162.5 | 162.8 | 163.0 | 163.2 | 45 | 1-00 |
| | 44 | 158.9 | 159.3 | 159.6 | 159.9 | 160.3 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 162.0 | 162.3 | 162.6 | 162.8 | 163.1 | 44 | |
| | 43 | 158.6 | 158.9 | 159.3 | 159.6 | 160.0 | 160.3 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 162.1 | 162.4 | 162.6 | 162.9 | 43 | |
| | 42 | 158.2 | 158.6 | 159.0 | 159.3 | 159.7 | 160.0 | 160.3 | 160.7 | 161.0 | 161.3 | 161.6 | 161.9 | 162.2 | 162.4 | 162.7 | 42 | |
| | 41 | 157.8 | 158.2 | 158.6 | 159.0 | 159.3 | 159.7 | 160.1 | 160.4 | 160.7 | 161.0 | 161.4 | 161.7 | 162.0 | 162.2 | 162.5 | 41 | |
| | 49 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.6 | 160.9 | 161.1 | 161.4 | 161.6 | 161.9 | 162.1 | 162.3 | 162.6 | 162.8 | 49 | |
| | 48 | 158.9 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.7 | 160.9 | 161.2 | 161.4 | 161.7 | 161.9 | 162.2 | 162.4 | 162.6 | 48 | |
| | 47 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.7 | 161.0 | 161.2 | 161.5 | 161.7 | 162.0 | 162.2 | 162.5 | 47 | |
| | 46 | 158.3 | 158.6 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.5 | 160.8 | 161.0 | 161.3 | 161.6 | 161.8 | 162.1 | 162.3 | 46 | |
| 10-56 | 45 | 157.9 | 158.3 | 158.6 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.5 | 160.8 | 161.1 | 161.4 | 161.6 | 161.9 | 162.2 | 45 | 1-04 |
| | 44 | 157.6 | 158.0 | 158.3 | 158.7 | 159.0 | 159.3 | 159.7 | 160.0 | 160.3 | 160.6 | 160.9 | 161.2 | 161.4 | 161.7 | 162.0 | 44 | |
| | 43 | 157.2 | 157.6 | 158.0 | 158.3 | 158.7 | 159.0 | 159.4 | 159.7 | 160.0 | 160.3 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 43 | |
| | 42 | 156.8 | 157.2 | 157.6 | 158.0 | 158.4 | 158.7 | 159.1 | 159.4 | 159.8 | 160.1 | 160.4 | 160.7 | 161.0 | 161.3 | 161.6 | 42 | |
| | 41 | 156.4 | 156.8 | 157.2 | 157.6 | 158.0 | 158.4 | 158.8 | 159.1 | 159.5 | 159.8 | 160.1 | 160.5 | 160.8 | 161.1 | 161.4 | 41 | |
| | 49 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.4 | 159.7 | 160.0 | 160.2 | 160.5 | 160.8 | 161.0 | 161.3 | 161.5 | 161.7 | 49 | |
| | 48 | 157.6 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 150.0 | 160.3 | 160.6 | 160.8 | 161.1 | 161.3 | 161.6 | 48 | |
| | 47 | 157.3 | 157.7 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.6 | 160.9 | 161.2 | 161.4 | 47 | |
| | 46 | 157.0 | 157.3 | 157.7 | 158.0 | 158.4 | 158.7 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.4 | 160.7 | 161.0 | 161.3 | 46 | |
| 10-52 | 45 | 156.6 | 157.0 | 157.4 | 157.7 | 158.1 | 158.4 | 158.7 | 159.0 | 159.3 | 159.7 | 160.0 | 160.2 | 160.5 | 160.8 | 161.1 | 45 | 1-08 |
| | 44 | 156.3 | 156.6 | 157.0 | 157.4 | 157.7 | 158.1 | 158.4 | 158.8 | 159.1 | 159.4 | 159.7 | 160.0 | 160.3 | 160.6 | 160.9 | 44 | |
| | 43 | 155.9 | 156.3 | 156.7 | 157.1 | 157.4 | 157.8 | 158.1 | 158.5 | 158.8 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.7 | 43 | |
| | 42 | 155.5 | 155.9 | 156.3 | 156.7 | 157.1 | 157.5 | 157.9 | 158.2 | 158.6 | 158.9 | 159.2 | 159.6 | 159.9 | 160.2 | 160.5 | 42 | |
| | 41 | 155.0 | 155.5 | 155.9 | 156.3 | 156.7 | 157.1 | 157.5 | 157.9 | 158.3 | 158.6 | 159.0 | 159.3 | 159.6 | 160.0 | 160.3 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 170.4 | 170.5 | 170.6 | 170.7 | 170.9 | 171.0 | 171.1 | 171.2 | 171.3 | 171.4 | 171.5 | 171.6 | 171.8 | 171.9 | 172.0 | 49 | |
| | 48 | 170.3 | 170.4 | 170.5 | 170.7 | 170.8 | 170.9 | 171.0 | 171.1 | 171.3 | 171.4 | 171.5 | 171.6 | 171.7 | 171.8 | 171.9 | 48 | |
| | 47 | 170.2 | 170.3 | 170.5 | 170.6 | 170.7 | 170.9 | 171.0 | 171.1 | 171.2 | 171.3 | 171.4 | 171.6 | 171.7 | 171.8 | 171.9 | 47 | |
| | 46 | 170.1 | 170.2 | 170.4 | 170.5 | 170.7 | 170.8 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.5 | 171.6 | 171.8 | 171.9 | 46 | |
| 11-24 | 45 | 170.0 | 170.2 | 170.3 | 170.4 | 170.6 | 170.7 | 170.8 | 171.0 | 171.1 | 171.2 | 171.3 | 171.5 | 171.6 | 171.7 | 171.8 | 45 | 0-36 |
| | 44 | 169.9 | 170.1 | 170.2 | 170.4 | 170.5 | 170.6 | 170.8 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.5 | 171.7 | 171.8 | 44 | |
| | 43 | 169.8 | 170.0 | 170.1 | 170.3 | 170.4 | 170.6 | 170.7 | 170.8 | 171.0 | 171.1 | 171.2 | 171.4 | 171.5 | 171.6 | 171.8 | 43 | |
| | 42 | 169.7 | 169.9 | 170.0 | 170.2 | 170.3 | 170.5 | 170.6 | 170.8 | 170.9 | 171.0 | 171.2 | 171.3 | 171.4 | 171.6 | 171.7 | 42 | |
| | 41 | 169.6 | 169.7 | 169.9 | 170.1 | 170.2 | 170.4 | 170.5 | 170.7 | 170.8 | 171.0 | 171.1 | 171.2 | 171.4 | 171.5 | 171.7 | 41 | |
| | 49 | 169.3 | 169.4 | 169.6 | 169.7 | 169.8 | 170.0 | 170.1 | 170.2 | 170.4 | 170.5 | 170.6 | 170.7 | 170.8 | 171.0 | 171.1 | 49 | |
| | 48 | 169.2 | 169.4 | 169.5 | 169.6 | 169.8 | 169.9 | 170.0 | 170.2 | 170.3 | 170.4 | 170.6 | 170.7 | 170.8 | 170.9 | 171.1 | 48 | |
| | 47 | 169.1 | 169.3 | 169.4 | 169.6 | 169.7 | 169.8 | 170.0 | 170.1 | 170.3 | 170.4 | 170.5 | 170.6 | 170.8 | 170.9 | 171.0 | 47 | |
| | 46 | 169.0 | 169.2 | 169.3 | 169.5 | 169.6 | 169.8 | 169.9 | 170.1 | 170.2 | 170.3 | 170.5 | 170.6 | 170.7 | 170.9 | 171.0 | 46 | |
| 11-20 | 45 | 168.9 | 169.1 | 169.2 | 169.4 | 169.5 | 169.7 | 169.8 | 170.0 | 170.1 | 170.3 | 170.4 | 170.5 | 170.7 | 170.8 | 170.9 | 45 | 0-40 |
| | 44 | 168.8 | 169.0 | 169.1 | 169.3 | 169.5 | 169.6 | 169.8 | 169.9 | 170.1 | 170.2 | 170.3 | 170.5 | 170.6 | 170.8 | 170.9 | 44 | |
| | 43 | 168.7 | 168.9 | 169.0 | 169.2 | 169.4 | 169.5 | 169.7 | 169.8 | 170.0 | 170.1 | 170.3 | 170.4 | 170.6 | 170.7 | 170.9 | 43 | |
| | 42 | 168.6 | 168.7 | 168.9 | 169.1 | 169.3 | 169.4 | 169.6 | 169.7 | 169.9 | 170.1 | 170.2 | 170.4 | 170.5 | 170.6 | 170.8 | 42 | |
| | 41 | 168.4 | 168.6 | 168.8 | 169.0 | 169.2 | 169.3 | 169.5 | 169.7 | 169.8 | 170.0 | 170.1 | 170.3 | 170.4 | 170.6 | 170.7 | 41 | |
| | 49 | 168.2 | 168.4 | 168.6 | 168.7 | 168.8 | 169.0 | 169.1 | 169.3 | 169.4 | 169.5 | 169.7 | 169.8 | 169.9 | 170.1 | 170.2 | 49 | |
| | 48 | 168.2 | 168.3 | 168.5 | 168.6 | 168.8 | 168.9 | 169.1 | 169.2 | 169.3 | 169.5 | 169.6 | 169.8 | 169.9 | 170.0 | 170.2 | 48 | |
| | 47 | 168.0 | 168.2 | 168.4 | 168.5 | 168.7 | 168.8 | 169.0 | 169.1 | 169.3 | 169.4 | 169.6 | 169.7 | 169.8 | 170.0 | 170.1 | 47 | |
| | 46 | 167.9 | 168.1 | 168.3 | 168.4 | 168.6 | 168.8 | 168.9 | 169.1 | 169.2 | 169.4 | 169.5 | 169.7 | 169.8 | 169.9 | 170.1 | 46 | |
| 11-16 | 45 | 167.8 | 168.0 | 168.2 | 168.3 | 168.5 | 168.7 | 168.8 | 169.0 | 169.1 | 169.3 | 169.4 | 169.6 | 169.7 | 169.9 | 170.0 | 45 | 0-44 |
| | 44 | 167.7 | 167.9 | 168.1 | 168.2 | 168.4 | 168.6 | 168.7 | 168.9 | 169.1 | 169.2 | 169.4 | 169.5 | 169.7 | 169.8 | 170.0 | 44 | |
| | 43 | 167.6 | 167.8 | 167.9 | 168.1 | 168.3 | 168.5 | 168.7 | 168.8 | 169.0 | 169.1 | 169.3 | 169.5 | 169.6 | 169.8 | 169.9 | 43 | |
| | 42 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.6 | 168.7 | 168.9 | 169.1 | 169.2 | 169.4 | 169.6 | 169.7 | 169.9 | 42 | |
| | 41 | 167.3 | 167.5 | 167.7 | 167.9 | 168.1 | 168.3 | 168.5 | 168.6 | 168.8 | 169.0 | 169.2 | 169.3 | 169.5 | 169.7 | 169.8 | 41 | |
| | 49 | 167.2 | 167.4 | 167.5 | 167.7 | 167.8 | 168.0 | 168.1 | 168.3 | 168.5 | 168.6 | 168.7 | 168.9 | 169.0 | 169.2 | 169.3 | 49 | |
| | 48 | 167.1 | 167.3 | 167.4 | 167.6 | 167.7 | 167.9 | 168.1 | 168.2 | 168.4 | 168.5 | 168.7 | 168.8 | 169.0 | 169.1 | 169.3 | 48 | |
| | 47 | 167.0 | 167.1 | 167.3 | 167.5 | 167.7 | 167.8 | 168.0 | 168.2 | 168.3 | 168.5 | 168.6 | 168.8 | 168.9 | 169.1 | 169.2 | 47 | |
| | 46 | 166.9 | 167.0 | 167.2 | 167.4 | 167.6 | 167.7 | 167.9 | 168.1 | 168.3 | 168.4 | 168.6 | 168.7 | 168.9 | 169.0 | 169.2 | 46 | |
| 11-12 | 45 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.7 | 167.8 | 168.0 | 168.2 | 168.3 | 168.5 | 168.7 | 168.8 | 169.0 | 169.1 | 45 | 0-48 |
| | 44 | 166.6 | 166.8 | 167.0 | 167.2 | 167.4 | 167.6 | 167.7 | 167.9 | 168.1 | 168.3 | 168.4 | 168.6 | 168.8 | 168.9 | 169.1 | 44 | |
| | 43 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.6 | 167.8 | 168.0 | 168.2 | 168.3 | 168.5 | 168.7 | 168.9 | 169.0 | 43 | |
| | 42 | 166.3 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.7 | 167.9 | 168.1 | 168.3 | 168.4 | 168.6 | 168.8 | 169.0 | 42 | |
| | 41 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 168.2 | 168.4 | 168.5 | 168.7 | 168.9 | 41 | |
| | 49 | 166.1 | 166.3 | 166.5 | 166.7 | 166.8 | 167.0 | 167.2 | 167.3 | 167.5 | 167.7 | 167.8 | 168.0 | 168.1 | 168.3 | 168.4 | 49 | |
| | 48 | 166.0 | 166.2 | 166.4 | 166.6 | 166.7 | 166.9 | 167.1 | 167.3 | 167.4 | 167.6 | 167.8 | 167.9 | 168.1 | 168.2 | 168.4 | 48 | |
| | 47 | 165.9 | 166.1 | 166.3 | 166.5 | 166.7 | 166.8 | 167.0 | 167.2 | 167.3 | 167.5 | 167.7 | 167.9 | 168.0 | 168.2 | 168.3 | 47 | |
| | 46 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.7 | 166.9 | 167.1 | 167.3 | 167.4 | 167.6 | 167.8 | 168.0 | 168.1 | 168.3 | 46 | |
| 11-08 | 45 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.2 | 167.4 | 167.5 | 167.7 | 167.9 | 168.1 | 168.2 | 45 | 0-52 |
| | 44 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.7 | 167.8 | 168.0 | 168.2 | 44 | |
| | 43 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.2 | 167.4 | 167.6 | 167.8 | 167.9 | 168.1 | 43 | |
| | 42 | 165.2 | 165.4 | 165.7 | 165.9 | 166.1 | 166.3 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 167.5 | 167.7 | 167.9 | 168.1 | 42 | |
| | 41 | 165.0 | 165.3 | 165.5 | 165.7 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.2 | 167.4 | 167.6 | 167.8 | 168.0 | 41 | |
| | 49 | 165.1 | 165.3 | 165.5 | 165.7 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.7 | 166.9 | 167.1 | 167.2 | 167.4 | 167.6 | 49 | |
| | 48 | 165.0 | 165.2 | 165.4 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.5 | 166.6 | 166.8 | 167.0 | 167.2 | 167.3 | 167.5 | 48 | |
| | 47 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 166.9 | 167.1 | 167.3 | 167.5 | 47 | |
| | 46 | 164.7 | 164.9 | 165.1 | 165.3 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.5 | 166.7 | 166.9 | 167.0 | 167.2 | 167.4 | 46 | |
| 11-04 | 45 | 164.6 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.2 | 167.4 | 45 | 0-56 |
| | 44 | 164.4 | 164.6 | 164.9 | 165.1 | 165.3 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.5 | 166.7 | 166.9 | 167.1 | 167.3 | 44 | |
| | 43 | 164.3 | 164.5 | 164.7 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 166.8 | 167.0 | 167.2 | 43 | |
| | 42 | 164.1 | 164.3 | 164.6 | 164.8 | 165.0 | 165.3 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.6 | 166.8 | 167.0 | 167.2 | 42 | |
| | 41 | 163.9 | 164.2 | 164.4 | 164.7 | 164.9 | 165.1 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.5 | 166.7 | 166.9 | 167.1 | 41 | |
| | 49 | 164.0 | 164.2 | 164.5 | 164.7 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.1 | 166.3 | 166.5 | 166.7 | 49 | |
| | 48 | 163.9 | 164.1 | 164.3 | 164.5 | 164.7 | 164.9 | 165.1 | 165.3 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.4 | 166.6 | 48 | |
| | 47 | 163.8 | 164.0 | 164.2 | 164.4 | 164.6 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 166.6 | 47 | |
| | 46 | 163.6 | 163.9 | 164.1 | 164.3 | 164.5 | 164.7 | 164.9 | 165.1 | 165.4 | 165.6 | 165.8 | 166.0 | 166.1 | 166.3 | 166.5 | 46 | |
| 11-00 | 45 | 163.5 | 163.7 | 164.0 | 164.2 | 164.4 | 164.6 | 164.8 | 165.1 | 165.3 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 166.5 | 45 | 1-00 |
| | 44 | 163.3 | 163.6 | 163.8 | 164.0 | 164.3 | 164.5 | 164.7 | 164.9 | 165.2 | 165.4 | 165.6 | 165.8 | 166.0 | 166.2 | 166.4 | 44 | |
| | 43 | 163.2 | 163.4 | 163.7 | 163.9 | 164.1 | 164.4 | 164.6 | 164.8 | 165.1 | 165.3 | 165.5 | 165.7 | 165.9 | 166.1 | 166.3 | 43 | |
| | 42 | 163.0 | 163.2 | 163.5 | 163.8 | 164.0 | 164.2 | 164.5 | 164.7 | 164.9 | 165.2 | 165.4 | 165.6 | 165.8 | 166.1 | 166.3 | 42 | |
| | 41 | 162.8 | 163.1 | 163.3 | 163.6 | 163.9 | 164.1 | 164.3 | 164.6 | 164.8 | 165.1 | 165.3 | 165.5 | 165.8 | 166.0 | 166.2 | 41 | |
| | 49 | 163.0 | 163.2 | 163.4 | 163.6 | 163.8 | 164.1 | 164.3 | 164.5 | 164.7 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.8 | 49 | |
| | 48 | 162.9 | 163.1 | 163.3 | 163.5 | 163.7 | 163.9 | 164.2 | 164.4 | 164.6 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 165.7 | 48 | |
| | 47 | 162.7 | 163.0 | 163.2 | 163.4 | 163.6 | 163.8 | 164.1 | 164.3 | 164.5 | 164.7 | 164.9 | 165.1 | 165.3 | 165.5 | 165.7 | 47 | |
| | 46 | 162.6 | 162.8 | 163.0 | 163.3 | 163.5 | 163.7 | 164.0 | 164.2 | 164.4 | 164.6 | 164.8 | 165.0 | 165.2 | 165.4 | 165.6 | 46 | |
| 10-56 | 45 | 162.4 | 162.7 | 162.9 | 163.1 | 163.4 | 163.6 | 163.8 | 164.1 | 164.3 | 164.5 | 164.7 | 164.9 | 165.2 | 165.4 | 165.6 | 45 | 1-04 |
| | 44 | 162.2 | 162.5 | 162.8 | 163.0 | 163.3 | 163.5 | 163.7 | 164.0 | 164.2 | 164.4 | 164.6 | 164.9 | 165.1 | 165.3 | 165.5 | 44 | |
| | 43 | 162.[illegible] | 162.3 | 162.6 | 162.9 | 163.1 | 163.4 | 163.6 | 163.8 | 164.1 | 164.3 | 164.5 | 164.8 | 165.0 | 165.2 | 165.4 | 43 | |
| | 42 | 161.9 | 162.2 | 162.4 | 162.7 | 163.0 | 163.2 | 163.5 | 163.7 | 164.0 | 164.2 | 164.4 | 164.7 | 164.9 | 165.1 | 165.4 | 42 | |
| | 41 | 161.7 | 162.0 | 162.3 | 162.5 | 162.8 | 163.1 | 163.3 | 163.6 | 163.8 | 164.1 | 164.3 | 164.6 | 164.8 | 165.0 | 165.3 | 41 | |
| | 49 | 162.0 | 162.2 | 162.4 | 162.6 | 162.9 | 163.1 | 163.3 | 163.5 | 163.7 | 163.9 | 164.1 | 164.3 | 164.5 | 164.7 | 164.9 | 49 | |
| | 48 | 161.8 | 162.1 | 162.3 | 162.5 | 162.7 | 163.0 | 163.2 | 163.4 | 163.6 | 163.8 | 164.0 | 164.3 | 164.5 | 164.7 | 164.9 | 48 | |
| | 47 | 161.7 | 161.9 | 162.2 | 162.4 | 162.6 | 162.9 | 163.1 | 163.3 | 163.5 | 163.7 | 164.0 | 164.2 | 164.4 | 164.6 | 164.8 | 47 | |
| | 46 | 161.5 | 161.8 | 162.0 | 162.3 | 162.5 | 162.7 | 163.0 | 163.2 | 163.4 | 163.7 | 163.9 | 164.1 | 164.3 | 164.5 | 164.8 | 46 | |
| 10-52 | 45 | 161.4 | 161.6 | 161.9 | 162.1 | 162.4 | 162.6 | 162.9 | 163.1 | 163.3 | 163.6 | 163.8 | 164.0 | 164.2 | 164.5 | 164.7 | 45 | 1-08 |
| | 44 | 161.2 | 161.4 | 161.7 | 162.0 | 162.2 | 162.5 | 162.7 | 163.0 | 163.2 | 163.5 | 163.7 | 163.9 | 164.2 | 164.4 | 164.6 | 44 | |
| | 43 | 161.0 | 161.3 | 161.5 | 161.8 | 162.1 | 162.3 | 162.6 | 162.9 | 163.1 | 163.4 | 163.6 | 163.8 | 164.1 | 164.3 | 164.5 | 43 | |
| | 42 | 160.8 | 161.1 | 161.4 | 161.7 | 161.9 | 162.2 | 162.5 | 162.7 | 163.0 | 163.2 | 163.5 | 163.7 | 164.0 | 164.2 | 164.5 | 42 | |
| | 41 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 162.0 | 162.3 | 162.6 | 162.9 | 163.1 | 163.4 | 163.6 | 163.9 | 164.1 | 164.4 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A.M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.4 | 159.7 | 160.0 | 160.2 | 160.5 | 160.8 | 161.0 | 161.3 | 161.5 | 161.7 | 49 | |
| | 48 | 157.6 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 160.0 | 160.3 | 160.6 | 160.8 | 161.1 | 161.3 | 161.6 | 48 | |
| | 47 | 157.3 | 157.7 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.6 | 160.9 | 161.2 | 161.4 | 47 | |
| 10-52 | 46 | 157.0 | 157.3 | 157.7 | 158.0 | 158.4 | 158.7 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.4 | 160.7 | 161.0 | 161.3 | 46 | 1-08 |
| | 45 | 156.6 | 157.0 | 157.4 | 157.7 | 158.1 | 158.4 | 158.7 | 159.0 | 159.3 | 159.7 | 160.0 | 160.2 | 160.5 | 160.8 | 161.1 | 45 | |
| | 44 | 156.3 | 156.6 | 157.0 | 157.4 | 157.7 | 158.1 | 158.4 | 158.8 | 159.1 | 159.4 | 159.7 | 160.0 | 160.3 | 160.6 | 160.9 | 44 | |
| | 43 | 155.9 | 156.3 | 156.7 | 157.1 | 157.4 | 157.8 | 158.1 | 158.5 | 158.8 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.7 | 43 | |
| | 42 | 155.5 | 155.9 | 156.3 | 156.7 | 157.1 | 157.5 | 157.9 | 158.2 | 158.6 | 158.9 | 159.2 | 159.6 | 159.9 | 160.2 | 160.5 | 42 | |
| | 41 | 155.0 | 155.5 | 155.9 | 156.3 | 156.7 | 157.1 | 157.5 | 157.9 | 158.3 | 158.6 | 159.0 | 159.3 | 159.6 | 160.0 | 160.3 | 41 | |
| | 49 | 156.7 | 157.0 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 158.8 | 159.1 | 159.4 | 159.7 | 159.9 | 160.2 | 160.4 | 160.7 | 49 | |
| | 48 | 156.4 | 156.7 | 157.1 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 159.7 | 160.0 | 160.3 | 160.5 | 48 | |
| | 47 | 156.1 | 156.4 | 156.8 | 157.1 | 157.4 | 157.8 | 158.1 | 158.4 | 158.7 | 159.0 | 159.3 | 159.5 | 159.8 | 160.1 | 160.4 | 47 | |
| 10-48 | 46 | 155.7 | 156.1 | 156.4 | 156.8 | 157.1 | 157.5 | 157.8 | 158.1 | 158.4 | 158.8 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 46 | 1-12 |
| | 45 | 155.3 | 155.7 | 156.1 | 156.5 | 156.8 | 157.2 | 157.5 | 157.9 | 158.2 | 158.5 | 158.8 | 159.1 | 159.4 | 159.7 | 160.0 | 45 | |
| | 44 | 154.9 | 155.3 | 155.7 | 156.1 | 156.5 | 156.9 | 157.2 | 157.6 | 157.9 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 44 | |
| | 43 | 154.5 | 155.0 | 155.4 | 155.8 | 156.2 | 156.6 | 156.9 | 157.3 | 157.6 | 158.0 | 158.3 | 158.7 | 159.0 | 159.3 | 159.6 | 43 | |
| | 42 | 154.1 | 154.6 | 155.0 | 155.4 | 155.8 | 156.2 | 156.6 | 157.0 | 157.4 | 157.7 | 158.1 | 158.4 | 158.7 | 159.1 | 159.4 | 42 | |
| | 41 | 153.7 | 154.1 | 154.6 | 155.0 | 155.4 | 155.9 | 156.3 | 156.7 | 157.1 | 157.4 | 157.8 | 158.2 | 158.5 | 158.8 | 159.2 | 41 | |
| | 49 | 155.5 | 155.8 | 156.2 | 156.5 | 156.8 | 157.1 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 158.8 | 159.1 | 159.4 | 159.6 | 49 | |
| | 48 | 155.1 | 155.5 | 155.8 | 156.2 | 156.5 | 156.9 | 157.2 | 157.5 | 157.8 | 158.1 | 158.4 | 158.7 | 158.9 | 159.2 | 159.5 | 48 | |
| | 47 | 154.8 | 155.2 | 155.5 | 155.9 | 156.2 | 156.6 | 156.9 | 157.2 | 157.5 | 157.9 | 158.2 | 158.4 | 158.7 | 159.0 | 159.3 | 47 | |
| 10-44 | 46 | 154.4 | 154.8 | 155.2 | 155.6 | 155.9 | 156.3 | 156.6 | 157.0 | 157.3 | 157.6 | 157.9 | 158.2 | 158.5 | 158.8 | 159.1 | 46 | 1-16 |
| | 45 | 154.0 | 154.5 | 154.9 | 155.2 | 155.6 | 156.0 | 156.3 | 156.7 | 157.0 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 158.9 | 45 | |
| | 44 | 153.6 | 154.1 | 154.5 | 154.9 | 155.3 | 155.7 | 156.0 | 156.4 | 156.8 | 157.1 | 157.4 | 157.8 | 158.1 | 158.4 | 158.7 | 44 | |
| | 43 | 153.2 | 153.7 | 154.1 | 154.5 | 154.9 | 155.3 | 155.7 | 156.1 | 156.5 | 156.8 | 157.2 | 157.5 | 157.9 | 158.2 | 158.5 | 43 | |
| | 42 | 152.8 | 153.3 | 153.7 | 154.2 | 154.6 | 155.0 | 155.4 | 155.8 | 156.2 | 156.6 | 156.9 | 157.3 | 157.6 | 158.0 | 158.3 | 42 | |
| | 41 | 152.3 | 152.8 | 153.3 | 153.7 | 154.2 | 154.6 | 155.0 | 155.5 | 155.9 | 156.3 | 156.6 | 157.0 | 157.4 | 157.7 | 158.1 | 41 | |
| | 49 | 154.3 | 154.6 | 155.0 | 155.3 | 155.6 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 158.1 | 158.3 | 158.6 | 49 | |
| | 48 | 153.9 | 154.3 | 154.6 | 155.0 | 155.3 | 155.7 | 156.0 | 156.3 | 156.7 | 157.0 | 157.3 | 157.6 | 157.9 | 158.2 | 158.4 | 48 | |
| | 47 | 153.6 | 153.9 | 154.3 | 154.7 | 155.1 | 155.4 | 155.7 | 156.1 | 156.4 | 156.7 | 157.1 | 157.4 | 157.7 | 158.0 | 158.3 | 47 | |
| 10-40 | 46 | 153.2 | 153.6 | 154.0 | 154.4 | 154.7 | 155.1 | 155.5 | 155.8 | 156.2 | 156.5 | 156.8 | 157.1 | 157.5 | 157.8 | 158.1 | 46 | 1-20 |
| | 45 | 152.8 | 153.2 | 153.6 | 154.0 | 154.4 | 154.8 | 155.2 | 155.5 | 155.9 | 156.2 | 156.6 | 156.9 | 157.2 | 157.6 | 157.9 | 45 | |
| | 44 | 152.4 | 152.8 | 153.2 | 153.7 | 154.1 | 154.5 | 154.9 | 155.2 | 155.6 | 156.0 | 156.3 | 156.7 | 157.0 | 157.3 | 157.7 | 44 | |
| | 43 | 151.9 | 152.4 | 152.8 | 153.3 | 153.7 | 154.1 | 154.5 | 154.9 | 155.3 | 155.7 | 156.0 | 156.4 | 156.8 | 157.1 | 157.4 | 43 | |
| | 42 | 151.5 | 152.0 | 152.4 | 152.9 | 153.3 | 153.8 | 154.2 | 154.6 | 155.0 | 155.4 | 155.8 | 156.1 | 156.5 | 156.9 | 157.2 | 42 | |
| | 41 | 151.0 | 151.5 | 152.0 | 152.5 | 152.9 | 153.4 | 153.8 | 154.3 | 154.7 | 155.1 | 155.5 | 155.9 | 156.2 | 156.6 | 157.0 | 41 | |
| | 49 | 153.0 | 153.4 | 153.8 | 154.1 | 154.5 | 154.8 | 155.2 | 155.5 | 155.8 | 156.1 | 156.4 | 156.7 | 157.0 | 157.3 | 157.6 | 49 | |
| | 48 | 152.7 | 153.1 | 153.4 | 153.8 | 154.2 | 154.5 | 154.9 | 155.2 | 155.5 | 155.9 | 156.2 | 156.5 | 156.8 | 157.1 | 157.4 | 48 | |
| | 47 | 152.3 | 152.7 | 153.1 | 153.5 | 153.9 | 154.2 | 154.6 | 155.0 | 155.3 | 155.6 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 47 | |
| 10-36 | 46 | 151.9 | 152.4 | 152.8 | 153.2 | 153.5 | 153.9 | 154.3 | 154.7 | 155.0 | 155.4 | 155.7 | 156.0 | 156.4 | 156.7 | 157.0 | 46 | 1-24 |
| | 45 | 151.5 | 152.0 | 152.4 | 152.8 | 153.2 | 153.6 | 154.0 | 154.4 | 154.8 | 155.1 | 155.5 | 155.8 | 156.2 | 156.5 | 156.8 | 45 | |
| | 44 | 151.1 | 151.5 | 152.0 | 152.4 | 152.9 | 153.3 | 153.7 | 154.1 | 154.5 | 154.8 | 155.2 | 155.6 | 155.9 | 156.3 | 156.6 | 44 | |
| | 43 | 150.6 | 151.1 | 151.6 | 152.1 | 152.5 | 152.9 | 153.3 | 153.7 | 154.1 | 154.5 | 154.9 | 155.3 | 155.7 | 156.0 | 156.4 | 43 | |
| | 42 | 150.2 | 150.7 | 151.2 | 151.6 | 152.1 | 152.5 | 153.0 | 153.4 | 153.8 | 154.2 | 154.6 | 155.0 | 155.4 | 155.8 | 156.1 | 42 | |
| | 41 | 149.7 | 150.2 | 150.7 | 151.2 | 151.7 | 152.2 | 152.6 | 153.1 | 153.5 | 153.9 | 154.3 | 154.7 | 155.1 | 155.5 | 155.9 | 41 | |
| | 49 | 151.8 | 152.2 | 152.6 | 153.0 | 153.3 | 153.7 | 154.0 | 154.4 | 154.7 | 155.0 | 155.3 | 155.6 | 156.0 | 156.3 | 156.5 | 49 | |
| | 48 | 151.5 | 151.9 | 152.3 | 152.7 | 153.0 | 153.4 | 153.7 | 154.1 | 154.4 | 154.8 | 155.1 | 155.4 | 155.7 | 156.1 | 156.4 | 48 | |
| | 47 | 151.1 | 151.5 | 151.9 | 152.3 | 152.7 | 153.1 | 153.5 | 153.8 | 154.2 | 154.5 | 154.9 | 155.2 | 155.2 | 155.9 | 156.2 | 47 | |
| 10-32 | 46 | 150.7 | 151.1 | 151.6 | 152.0 | 152.4 | 152.8 | 153.2 | 153.5 | 153.9 | 154.3 | 154.6 | 155.0 | 155.3 | 155.6 | 156.0 | 46 | 1-28 |
| | 45 | 150.3 | 150.7 | 151.2 | 151.6 | 152.0 | 152.4 | 152.8 | 153.2 | 153.6 | 154.0 | 154.4 | 154.7 | 155.1 | 155.4 | 155.8 | 45 | |
| | 44 | 149.8 | 150.3 | 150.8 | 151.2 | 151.7 | 152.1 | 152.5 | 152.9 | 153.3 | 153.7 | 154.1 | 154.5 | 154.8 | 155.2 | 155.5 | 44 | |
| | 43 | 149.4 | 149.9 | 150.4 | 150.8 | 151.3 | 151.7 | 152.2 | 152.6 | 153.0 | 153.4 | 153.8 | 154.2 | 154.6 | 154.9 | 155.3 | 43 | |
| | 42 | 148.9 | 149.4 | 149.9 | 150.4 | 150.9 | 151.3 | 151.8 | 152.3 | 152.7 | 153.1 | 153.5 | 153.9 | 154.3 | 154.7 | 155.1 | 42 | |
| | 41 | 148.4 | 148.9 | 149.4 | 150.0 | 150.4 | 150.9 | 151.4 | 151.9 | 152.3 | 152.8 | 153.2 | 153.6 | 154.0 | 154.4 | 154.8 | 41 | |
| | 49 | 150.7 | 151.0 | 151.4 | 151.8 | 152.2 | 152.6 | 152.9 | 153.3 | 153.6 | 153.9 | 154.3 | 154.6 | 154.9 | 155.2 | 155.5 | 49 | |
| | 48 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 152.3 | 152.6 | 153.0 | 153.3 | 153.7 | 154.0 | 154.4 | 154.7 | 155.0 | 155.3 | 48 | |
| | 47 | 149.9 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 152.3 | 152.7 | 153.1 | 153.4 | 153.8 | 154.1 | 154.5 | 154.8 | 155.1 | 47 | |
| 10-28 | 46 | 149.5 | 149.9 | 150.4 | 150.8 | 151.2 | 151.6 | 152.0 | 152.4 | 152.8 | 153.2 | 153.5 | 153.9 | 154.2 | 154.6 | 154.9 | 46 | 1-32 |
| | 45 | 149.0 | 149.5 | 150.0 | 150.4 | 150.8 | 151.3 | 151.7 | 152.1 | 152.5 | 152.9 | 153.3 | 153.6 | 154.0 | 154.4 | 154.7 | 45 | |
| | 44 | 148.6 | 149.1 | 149.6 | 150.0 | 150.5 | 150.9 | 151.4 | 151.8 | 152.2 | 152.6 | 153.0 | 153.4 | 153.8 | 154.1 | 154.5 | 44 | |
| | 43 | 148.1 | 148.6 | 149.1 | 149.6 | 150.1 | 150.5 | 151.0 | 151.4 | 151.9 | 152.3 | 152.7 | 153.1 | 153.5 | 153.9 | 154.3 | 43 | |
| | 42 | 147.6 | 148.2 | 148.7 | 149.2 | 149.7 | 150.2 | 150.6 | 151.1 | 151.5 | 152.0 | 152.4 | 152.8 | 153.2 | 153.6 | 154.0 | 42 | |
| | 41 | 147.1 | 147.7 | 148.2 | 148.7 | 149.2 | 149.7 | 150.2 | 150.7 | 151.2 | 151.6 | 152.1 | 152.5 | 152.9 | 153.3 | 153.7 | 41 | |
| | 49 | 149.5 | 149.9 | 150.3 | 150.7 | 151.1 | 151.4 | 151.8 | 152.2 | 152.5 | 152.9 | 153.2 | 153.5 | 153.9 | 154.2 | 154.5 | 49 | |
| | 48 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 152.3 | 152.6 | 153.0 | 153.3 | 153.7 | 154.0 | 154.3 | 48 | |
| | 47 | 148.7 | 149.1 | 149.6 | 150.0 | 150.4 | 150.8 | 151.2 | 151.6 | 152.0 | 152.3 | 152.7 | 153.1 | 153.4 | 153.8 | 154.1 | 47 | |
| 10-24 | 46 | 148.2 | 148.7 | 149.2 | 149.6 | 150.1 | 150.5 | 150.9 | 151.3 | 151.7 | 152.1 | 152.5 | 152.8 | 153.2 | 153.6 | 153.9 | 46 | 1-36 |
| | 45 | 147.8 | 148.3 | 148.8 | 149.2 | 149.7 | 150.1 | 150.6 | 151.0 | 151.4 | 151.8 | 152.2 | 152.6 | 152.9 | 153.3 | 153.7 | 45 | |
| | 44 | 147.4 | 147.9 | 148.4 | 148.8 | 149.3 | 149.8 | 150.2 | 150.6 | 151.1 | 151.5 | 151.9 | 152.3 | 152.7 | 153.1 | 153.5 | 44 | |
| | 43 | 146.9 | 147.4 | 147.9 | 148.4 | 148.9 | 149.4 | 149.8 | 150.3 | 150.7 | 151.2 | 151.6 | 152.0 | 152.4 | 152.8 | 153.2 | 43 | |
| | 42 | 146.4 | 146.9 | 147.5 | 148.0 | 148.5 | 149.0 | 149.5 | 149.9 | 150.4 | 150.8 | 151.3 | 151.7 | 152.1 | 152.6 | 153.0 | 42 | |
| | 41 | 145.8 | 146.4 | 147.0 | 147.5 | 148.0 | 148.6 | 149.1 | 149.6 | 150.0 | 150.5 | 151.0 | 151.4 | 151.8 | 152.3 | 152.7 | 41 | |
| | 49 | 148.3 | 148.7 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.1 | 151.4 | 151.8 | 152.2 | 152.5 | 152.8 | 153.2 | 153.5 | 49 | |
| | 48 | 147.9 | 148.3 | 148.8 | 149.2 | 149.6 | 150.0 | 150.4 | 150.8 | 151.2 | 151.5 | 151.9 | 152.3 | 152.6 | 153.0 | 153.3 | 48 | |
| | 47 | 147.5 | 147.9 | 148.4 | 148.8 | 149.3 | 149.7 | 150.1 | 150.5 | 150.9 | 151.3 | 151.7 | 152.0 | 152.4 | 152.7 | 153.1 | 47 | |
| 10-20 | 46 | 147.1 | 147.5 | 148.0 | 148.5 | 148.9 | 149.3 | 149.8 | 150.2 | 150.6 | 151.0 | 151.4 | 151.8 | 152.2 | 152.5 | 152.9 | 46 | 1-40 |
| | 45 | 146.6 | 147.1 | 147.6 | 148.1 | 148.5 | 149.0 | 149.4 | 149.9 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 152.3 | 152.7 | 45 | |
| | 44 | 146.1 | 146.7 | 147.2 | 147.7 | 148.1 | 148.6 | 149.1 | 149.5 | 150.0 | 150.4 | 150.8 | 151.2 | 151.6 | 152.0 | 152.4 | 44 | |
| | 43 | 145.6 | 146.2 | 146.7 | 147.2 | 147.7 | 148.2 | 148.7 | 149.2 | 149.6 | 150.1 | 150.5 | 150.9 | 151.4 | 151.8 | 152.2 | 43 | |
| | 42 | 145.1 | 145.7 | 146.3 | 146.8 | 147.3 | 147.8 | 148.3 | 148.8 | 149.3 | 149.7 | 150.2 | 150.6 | 151.1 | 151.5 | 151.9 | 42 | |
| | 41 | 144.6 | 145.2 | 145.8 | 146.3 | 146.9 | 147.4 | 147.9 | 148.4 | 148.9 | 149.4 | 149.9 | 150.3 | 150.8 | 151.2 | 151.6 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 162.0 | 162.2 | 162.4 | 162.6 | 162.9 | 163.1 | 163.3 | 163.5 | 163.7 | 163.9 | 164.1 | 164.3 | 164.5 | 164.7 | 164.9 | 49 | |
| | 48 | 161.8 | 162.1 | 162.3 | 162.5 | 162.7 | 163.0 | 163.2 | 163.4 | 163.6 | 163.8 | 164.0 | 164.3 | 164.5 | 164.7 | 164.9 | 48 | |
| | 47 | 161.7 | 161.9 | 162.2 | 162.4 | 162.6 | 162.9 | 163.1 | 163.3 | 163.5 | 163.7 | 164.0 | 164.2 | 164.4 | 164.6 | 164.8 | 47 | |
| | 46 | 161.5 | 161.8 | 162.0 | 162.3 | 162.5 | 162.7 | 163.0 | 163.2 | 163.4 | 163.7 | 163.9 | 164.1 | 164.3 | 164.5 | 164.8 | 46 | |
| 10-52 | 45 | 161.4 | 161.6 | 161.9 | 162.1 | 162.4 | 162.6 | 162.9 | 163.1 | 163.3 | 163.6 | 163.8 | 164.0 | 164.2 | 164.5 | 164.7 | 45 | 1-08 |
| | 44 | 161.2 | 161.4 | 161.7 | 162.0 | 162.2 | 162.5 | 162.7 | 163.0 | 163.2 | 163.5 | 163.7 | 163.9 | 164.2 | 164.4 | 164.6 | 44 | |
| | 43 | 161.0 | 161.3 | 161.5 | 161.8 | 162.1 | 162.3 | 162.6 | 162.9 | 163.1 | 163.4 | 163.6 | 163.8 | 164.1 | 164.3 | 164.5 | 43 | |
| | 42 | 160.8 | 161.1 | 161.4 | 161.7 | 161.9 | 162.2 | 162.5 | 162.7 | 163.0 | 163.2 | 163.5 | 163.7 | 164.0 | 164.2 | 164.5 | 42 | |
| | 41 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 162.0 | 162.3 | 162.6 | 162.9 | 163.1 | 163.4 | 163.6 | 163.9 | 164.1 | 164.4 | 41 | |
| | 49 | 160.9 | 161.2 | 161.4 | 161.6 | 161.9 | 162.1 | 162.3 | 162.6 | 162.8 | 163.0 | 163.2 | 163.4 | 163.6 | 163.8 | 164.1 | 49 | |
| | 48 | 160.8 | 161.0 | 161.3 | 161.5 | 161.8 | 162.0 | 162.2 | 162.4 | 162.7 | 162.9 | 163.1 | 163.3 | 163.6 | 163.8 | 164.0 | 48 | |
| | 47 | 160.6 | 160.9 | 161.1 | 161.4 | 161.6 | 161.9 | 162.1 | 162.3 | 162.6 | 162.8 | 163.0 | 163.3 | 163.5 | 163.7 | 163.9 | 47 | |
| | 46 | 160.5 | 160.7 | 161.0 | 161.2 | 161.5 | 161.8 | 162.0 | 162.3 | 162.5 | 162.7 | 163.0 | 163.2 | 163.4 | 163.7 | 163.9 | 46 | |
| 10-48 | 45 | 160.3 | 160.6 | 160.8 | 161.1 | 161.4 | 161.6 | 161.9 | 162.1 | 162.4 | 162.6 | 162.9 | 163.1 | 163.3 | 163.6 | 163.8 | 45 | 1-12 |
| | 44 | 160.1 | 160.4 | 160.7 | 161.0 | 161.2 | 161.5 | 161.8 | 162.0 | 162.3 | 162.5 | 162.8 | 163.0 | 163.3 | 163.5 | 163.7 | 44 | |
| | 43 | 159.9 | 160.2 | 160.5 | 160.8 | 161.1 | 161.3 | 161.6 | 161.9 | 162.1 | 162.4 | 162.7 | 162.9 | 163.2 | 163.4 | 163.7 | 43 | |
| | 42 | 159.7 | 160.0 | 160.3 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 162.0 | 162.3 | 162.5 | 162.8 | 163.1 | 163.3 | 163.6 | 42 | |
| | 41 | 159.5 | 159.8 | 160.1 | 160.4 | 160.7 | 161.0 | 161.3 | 161.6 | 161.9 | 162.2 | 162.4 | 162.7 | 163.0 | 163.2 | 163.5 | 41 | |
| | 49 | 159.9 | 160.2 | 160.4 | 160.7 | 160.9 | 161.1 | 161.4 | 161.6 | 161.8 | 162.1 | 162.3 | 162.5 | 162.7 | 163.0 | 163.2 | 49 | |
| | 48 | 159.8 | 160.0 | 160.3 | 160.5 | 160.8 | 161.0 | 161.3 | 161.5 | 161.7 | 162.0 | 162.2 | 162.4 | 162.7 | 162.9 | 163.1 | 48 | |
| | 47 | 159.6 | 159.9 | 160.1 | 160.4 | 160.6 | 160.9 | 161.1 | 161.4 | 161.6 | 161.9 | 162.1 | 162.4 | 162.6 | 162.8 | 163.1 | 47 | |
| | 46 | 159.4 | 159.7 | 160.0 | 160.2 | 160.5 | 160.8 | 161.0 | 161.3 | 161.5 | 161.8 | 162.0 | 162.3 | 162.5 | 162.8 | 163.0 | 46 | |
| 10-44 | 45 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.6 | 160.9 | 161.2 | 161.4 | 161.7 | 161.9 | 162.2 | 162.4 | 162.7 | 162.9 | 45 | 1-16 |
| | 44 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.5 | 160.8 | 161.1 | 161.3 | 161.6 | 161.8 | 162.1 | 162.4 | 162.6 | 162.9 | 44 | |
| | 43 | 158.8 | 159.2 | 159.5 | 159.8 | 160.0 | 160.3 | 160.6 | 160.9 | 161.2 | 161.5 | 161.7 | 162.0 | 162.3 | 162.5 | 162.8 | 43 | |
| | 42 | 158.6 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.5 | 160.8 | 161.1 | 161.3 | 161.6 | 161.9 | 162.2 | 162.4 | 162.7 | 42 | |
| | 41 | 158.4 | 158.8 | 159.1 | 159.4 | 159.7 | 160.0 | 160.3 | 160.6 | 160.9 | 161.2 | 161.5 | 161.8 | 162.0 | 162.3 | 162.6 | 41 | |
| | 49 | 158.9 | 159.1 | 159.4 | 159.7 | 159.9 | 160.2 | 160.4 | 160.7 | 160.9 | 161.2 | 161.4 | 161.6 | 161.9 | 162.1 | 162.3 | 49 | |
| | 48 | 158.7 | 159.0 | 159.3 | 159.5 | 159.8 | 160.0 | 160.3 | 160.6 | 160.8 | 161.1 | 161.3 | 161.5 | 161.8 | 162.0 | 162.3 | 48 | |
| | 47 | 158.5 | 158.8 | 159.1 | 159.4 | 159.7 | 159.9 | 160.2 | 160.5 | 160.7 | 161.0 | 161.2 | 161.5 | 161.7 | 162.0 | 162.2 | 47 | |
| | 46 | 158.4 | 158.7 | 159.0 | 159.2 | 159.5 | 159.8 | 160.1 | 160.3 | 160.6 | 160.9 | 161.1 | 161.4 | 161.6 | 161.9 | 162.1 | 46 | |
| 10-40 | 45 | 158.2 | 158.5 | 158.8 | 159.1 | 159.4 | 159.7 | 159.9 | 160.2 | 160.5 | 160.8 | 161.0 | 161.3 | 161.6 | 161.8 | 162.1 | 45 | 1-20 |
| | 44 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.6 | 160.9 | 161.2 | 161.5 | 161.7 | 162.0 | 44 | |
| | 43 | 157.8 | 158.1 | 158.4 | 158.7 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.5 | 160.8 | 161.1 | 161.4 | 161.6 | 161.9 | 43 | |
| | 42 | 157.6 | 157.9 | 158.2 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 160.1 | 160.4 | 160.7 | 161.0 | 161.3 | 161.5 | 161.8 | 42 | |
| | 41 | 157.3 | 157.7 | 158.0 | 158.4 | 158.7 | 159.0 | 159.3 | 159.6 | 160.0 | 160.3 | 160.5 | 160.8 | 161.1 | 161.4 | 161.7 | 41 | |
| | 49 | 157.9 | 158.1 | 158.4 | 158.7 | 158.9 | 159.2 | 159.5 | 159.7 | 160.0 | 160.2 | 160.5 | 160.7 | 161.0 | 161.2 | 161.5 | 49 | |
| | 48 | 157.7 | 158.0 | 158.3 | 158.5 | 158.8 | 159.1 | 159.4 | 159.6 | 159.9 | 160.1 | 160.4 | 160.6 | 160.9 | 161.1 | 161.4 | 48 | |
| | 47 | 157.5 | 157.8 | 158.1 | 158.4 | 158.7 | 159.0 | 159.2 | 159.5 | 159.8 | 160.0 | 160.3 | 160.6 | 160.8 | 161.1 | 161.3 | 47 | |
| | 46 | 157.3 | 157.6 | 157.9 | 158.2 | 158.5 | 158.8 | 159.1 | 159.4 | 159.7 | 159.9 | 160.2 | 160.5 | 160.7 | 161.0 | 161.3 | 46 | |
| 10-36 | 45 | 157.1 | 157.5 | 157.8 | 158.1 | 158.4 | 158.7 | 159.0 | 159.3 | 159.5 | 159.8 | 160.1 | 160.4 | 160.6 | 160.9 | 161.2 | 45 | 1-24 |
| | 44 | 156.9 | 157.3 | 157.6 | 157.9 | 158.2 | 158.5 | 158.8 | 159.1 | 159.4 | 159.7 | 160.0 | 160.3 | 160.6 | 160.8 | 161.1 | 44 | |
| | 43 | 156.7 | 157.1 | 157.4 | 157.7 | 158.0 | 158.4 | 158.7 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.5 | 160.7 | 161.0 | 43 | |
| | 42 | 156.5 | 156.8 | 157.2 | 157.5 | 157.9 | 158.2 | 158.5 | 158.8 | 159.1 | 159.4 | 159.7 | 160.0 | 160.3 | 160.6 | 160.9 | 42 | |
| | 41 | 156.3 | 156.6 | 157.0 | 157.3 | 157.7 | 158.0 | 158.3 | 158.7 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 160.5 | 160.8 | 41 | |
| | 49 | 156.8 | 157.1 | 157.4 | 157.7 | 158.0 | 158.2 | 158.5 | 158.8 | 159.0 | 159.3 | 159.6 | 159.8 | 160.1 | 160.3 | 160.6 | 49 | |
| | 48 | 156.7 | 157.0 | 157.3 | 157.5 | 157.8 | 158.1 | 158.4 | 158.7 | 158.9 | 159.2 | 159.5 | 159.7 | 160.0 | 160.3 | 160.5 | 48 | |
| | 47 | 156.5 | 156.8 | 157.1 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 158.8 | 159.1 | 159.4 | 159.7 | 159.9 | 160.2 | 160.5 | 47 | |
| | 46 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.9 | 158.1 | 158.4 | 158.7 | 159.0 | 159.3 | 159.6 | 159.9 | 160.1 | 160.4 | 46 | |
| 10-32 | 45 | 156.1 | 156.4 | 156.7 | 157.1 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 159.8 | 160.0 | 160.3 | 45 | 1-28 |
| | 44 | 155.9 | 156.2 | 156.6 | 156.9 | 157.2 | 157.5 | 157.9 | 158.2 | 158.5 | 158.8 | 159.1 | 159.4 | 159.7 | 160.0 | 160.2 | 44 | |
| | 43 | 155.7 | 156.0 | 156.4 | 156.7 | 157.0 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 159.0 | 159.3 | 159.6 | 159.9 | 160.2 | 43 | |
| | 42 | 155.4 | 155.8 | 156.2 | 156.5 | 156.9 | 157.2 | 157.5 | 157.9 | 158.2 | 158.5 | 158.8 | 159.1 | 159.4 | 159.8 | 160.1 | 42 | |
| | 41 | 155.2 | 155.6 | 156.0 | 156.3 | 156.7 | 157.0 | 157.4 | 157.7 | 158.0 | 158.4 | 158.7 | 159.0 | 159.3 | 159.6 | 160.0 | 41 | |
| | 49 | 155.8 | 156.1 | 156.4 | 156.7 | 157.0 | 157.3 | 157.6 | 157.9 | 158.1 | 158.4 | 158.7 | 158.9 | 159.2 | 159.5 | 159.7 | 49 | |
| | 48 | 155.7 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.7 | 158.0 | 158.3 | 158.6 | 158.9 | 159.1 | 159.4 | 159.7 | 48 | |
| | 47 | 155.5 | 155.8 | 156.1 | 156.4 | 156.7 | 157.0 | 157.3 | 157.6 | 157.9 | 158.2 | 158.5 | 158.8 | 159.1 | 159.3 | 159.6 | 47 | |
| | 46 | 155.3 | 155.6 | 155.9 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 158.1 | 158.4 | 158.7 | 159.0 | 159.3 | 159.5 | 46 | |
| 10-28 | 45 | 155.1 | 155.4 | 155.7 | 156.1 | 156.4 | 156.7 | 157.0 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 158.9 | 159.2 | 159.5 | 45 | 1-32 |
| | 44 | 154.9 | 155.2 | 155.6 | 155.9 | 156.2 | 156.6 | 156.9 | 157.2 | 157.6 | 157.8 | 158.2 | 158.5 | 158.8 | 159.1 | 159.4 | 44 | |
| | 43 | 154.6 | 155.0 | 155.4 | 155.7 | 156.1 | 156.4 | 156.7 | 157.1 | 157.4 | 157.7 | 158.0 | 158.4 | 158.7 | 159.0 | 159.3 | 43 | |
| | 42 | 154.4 | 154.8 | 155.1 | 155.5 | 155.9 | 156.2 | 156.6 | 156.9 | 157.2 | 157.6 | 157.9 | 158.2 | 158.6 | 158.9 | 159.2 | 42 | |
| | 41 | 154.2 | 154.5 | 154.9 | 155.3 | 155.7 | 156.0 | 156.4 | 156.7 | 157.1 | 157.4 | 157.8 | 158.1 | 158.4 | 158.8 | 159.1 | 41 | |
| | 49 | 154.8 | 155.1 | 155.4 | 155.7 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 158.1 | 158.3 | 158.6 | 158.9 | 49 | |
| | 48 | 154.6 | 155.0 | 155.4 | 155.7 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 158.1 | 158.3 | 158.5 | 158.8 | 48 | |
| | 47 | 154.5 | 154.8 | 155.1 | 155.4 | 155.8 | 156.1 | 156.4 | 156.7 | 157.0 | 157.3 | 157.6 | 157.9 | 158.2 | 158.5 | 158.8 | 47 | |
| | 46 | 154.3 | 154.6 | 154.9 | 155.3 | 155.6 | 155.9 | 156.2 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 158.1 | 158.4 | 158.7 | 46 | |
| 10-24 | 45 | 154.0 | 154.4 | 154.7 | 155.1 | 155.4 | 155.8 | 156.1 | 156.4 | 156.7 | 157.1 | 157.4 | 157.7 | 158.0 | 158.3 | 158.6 | 45 | 1-36 |
| | 44 | 153.8 | 154.2 | 154.6 | 154.9 | 155.3 | 155.6 | 155.9 | 156.3 | 156.6 | 156.9 | 157.3 | 157.6 | 157.9 | 158.2 | 158.5 | 44 | |
| | 43 | 153.6 | 154.0 | 154.4 | 154.7 | 155.1 | 155.4 | 155.8 | 156.1 | 156.5 | 156.8 | 157.1 | 157.5 | 157.8 | 158.1 | 158.4 | 43 | |
| | 42 | 153.4 | 153.7 | 154.1 | 154.5 | 154.9 | 155.2 | 155.6 | 156.0 | 156.3 | 156.7 | 157.0 | 157.3 | 157.7 | 158.0 | 158.3 | 42 | |
| | 41 | 153.1 | 153.5 | 153.9 | 154.3 | 154.7 | 155.0 | 155.4 | 155.8 | 156.2 | 156.5 | 156.9 | 157.2 | 157.5 | 157.9 | 158.2 | 41 | |
| | 49 | 153.8 | 154.2 | 154.5 | 154.8 | 155.1 | 155.4 | 155.7 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 158.0 | 49 | |
| | 48 | 153.6 | 154.0 | 154.3 | 154.6 | 155.0 | 155.3 | 155.6 | 155.9 | 156.2 | 156.5 | 156.8 | 157.1 | 157.4 | 157.7 | 158.0 | 48 | |
| | 47 | 153.5 | 153.8 | 154.1 | 154.5 | 154.8 | 155.1 | 155.4 | 155.8 | 156.1 | 156.4 | 156.7 | 157.0 | 157.3 | 157.6 | 157.9 | 47 | |
| | 46 | 153.2 | 153.6 | 154.0 | 154.3 | 154.6 | 155.0 | 155.3 | 155.6 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 46 | |
| 10-20 | 45 | 153.0 | 153.4 | 153.8 | 154.1 | 154.5 | 154.8 | 155.2 | 155.5 | 155.8 | 156.2 | 156.5 | 156.8 | 157.1 | 157.4 | 157.7 | 45 | 1-40 |
| | 44 | 152.8 | 153.2 | 153.6 | 153.9 | 154.3 | 154.6 | 155.0 | 155.3 | 155.7 | 156.0 | 156.4 | 156.7 | 157.0 | 157.3 | 157.7 | 44 | |
| | 43 | 152.6 | 153.0 | 153.3 | 153.7 | 154.1 | 154.5 | 154.8 | 155.2 | 155.5 | 155.9 | 156.2 | 156.6 | 156.9 | 157.2 | 157.6 | 43 | |
| | 42 | 152.3 | 152.7 | 153.1 | 153.5 | 153.9 | 154.3 | 154.7 | 155.0 | 155.3 | 155.7 | 156.1 | 156.4 | 156.8 | 157.1 | 157.5 | 42 | |
| | 41 | 152.1 | 152.5 | 152.9 | 153.3 | 153.7 | 154.1 | 154.5 | 154.8 | 155.2 | 155.6 | 156.0 | 156.3 | 156.7 | 157.0 | 157.4 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 148.3 | 148.7 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.1 | 151.4 | 151.8 | 152.2 | 152.5 | 152.8 | 153.2 | 153.5 | 49 | |
| | 48 | 147.9 | 148.3 | 148.8 | 149.2 | 149.6 | 150.0 | 150.4 | 150.8 | 151.2 | 151.5 | 151.9 | 152.3 | 152.6 | 153.0 | 153.3 | 48 | |
| | 47 | 147.5 | 147.9 | 148.4 | 148.8 | 149.3 | 149.7 | 150.1 | 150.5 | 150.9 | 151.3 | 151.7 | 152.0 | 152.4 | 152.7 | 153.1 | 47 | |
| 10-20 | 46 | 147.1 | 147.5 | 148.0 | 148.5 | 148.9 | 149.3 | 149.8 | 150.2 | 150.6 | 151.0 | 151.4 | 151.8 | 152.2 | 152.5 | 152.9 | 46 | |
| | 45 | 146.6 | 147.1 | 147.6 | 148.1 | 148.5 | 149.0 | 149.4 | 149.9 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 152.3 | 152.7 | 45 | 1-40 |
| | 44 | 146.1 | 146.7 | 147.2 | 147.7 | 148.1 | 148.6 | 149.1 | 149.5 | 150.0 | 150.4 | 150.8 | 151.2 | 151.6 | 152.0 | 152.4 | 44 | |
| | 43 | 145.6 | 146.2 | 146.7 | 147.2 | 147.7 | 148.2 | 148.7 | 149.2 | 149.6 | 150.1 | 150.5 | 150.9 | 151.4 | 151.8 | 152.2 | 43 | |
| | 42 | 145.1 | 145.7 | 146.3 | 146.8 | 147.3 | 147.8 | 148.3 | 148.8 | 149.3 | 149.7 | 150.2 | 150.6 | 151.1 | 151.5 | 151.9 | 42 | |
| | 41 | 144.6 | 145.2 | 145.8 | 146.3 | 146.9 | 147.4 | 147.9 | 148.4 | 148.9 | 149.4 | 149.9 | 150.3 | 150.8 | 151.2 | 151.6 | 41 | |
| | 49 | 147.1 | 147.6 | 148.0 | 148.4 | 148.8 | 149.2 | 149.6 | 150.0 | 150.4 | 150.7 | 151.1 | 151.5 | 151.8 | 152.2 | 152.5 | 49 | |
| | 48 | 146.7 | 147.2 | 147.6 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 150.5 | 150.9 | 151.2 | 151.6 | 152.0 | 152.3 | 48 | |
| | 47 | 146.3 | 146.8 | 147.2 | 147.7 | 148.1 | 148.6 | 149.0 | 149.4 | 149.8 | 150.2 | 150.6 | 151.0 | 151.4 | 151.7 | 152.1 | 47 | |
| | 46 | 145.9 | 146.4 | 146.8 | 147.3 | 147.8 | 148.2 | 148.7 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.2 | 151.5 | 151.9 | 46 | |
| 10-16 | 45 | 145.4 | 145.9 | 146.4 | 146.9 | 147.4 | 147.8 | 148.3 | 148.8 | 149.2 | 149.6 | 150.0 | 150.4 | 150.8 | 151.3 | 151.6 | 45 | 1-44 |
| | 44 | 144.9 | 145.5 | 146.0 | 146.5 | 147.0 | 147.5 | 148.0 | 148.4 | 148.9 | 149.3 | 149.7 | 150.2 | 150.6 | 151.0 | 151.4 | 44 | |
| | 43 | 144.4 | 145.0 | 145.5 | 146.1 | 146.6 | 147.1 | 147.6 | 148.0 | 148.5 | 149.0 | 149.4 | 149.9 | 150.3 | 150.7 | 151.1 | 43 | |
| | 42 | 143.9 | 144.5 | 145.1 | 145.6 | 146.1 | 146.7 | 147.2 | 147.7 | 148.2 | 148.6 | 149.1 | 149.6 | 150.0 | 150.5 | 150.9 | 42 | |
| | 41 | 143.4 | 144.0 | 144.6 | 145.1 | 145.7 | 146.2 | 146.8 | 147.3 | 147.8 | 148.3 | 148.8 | 149.2 | 149.7 | 150.2 | 150.6 | 41 | |
| | 49 | 146.0 | 146.4 | 146.9 | 147.3 | 147.7 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 150.4 | 150.8 | 151.1 | 151.5 | 49 | |
| | 48 | 145.6 | 146.0 | 146.5 | 146.9 | 147.4 | 147.8 | 148.2 | 148.6 | 149.0 | 149.4 | 149.8 | 150.2 | 150.6 | 150.9 | 151.3 | 48 | |
| | 47 | 145.1 | 145.6 | 146.1 | 146.6 | 147.0 | 147.5 | 147.9 | 148.3 | 148.7 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.1 | 47 | |
| | 46 | 144.7 | 145.2 | 145.7 | 146.2 | 146.6 | 147.1 | 147.6 | 148.0 | 148.4 | 148.9 | 149.3 | 149.7 | 150.1 | 150.5 | 150.9 | 46 | |
| 10-12 | 45 | 144.2 | 144.8 | 145.3 | 145.8 | 146.3 | 146.7 | 147.2 | 147.7 | 148.1 | 148.5 | 149.0 | 149.4 | 149.8 | 150.2 | 150.6 | 45 | 1-48 |
| | 44 | 143.8 | 144.3 | 144.8 | 145.3 | 145.9 | 146.4 | 146.8 | 147.3 | 147.8 | 148.2 | 148.7 | 149.1 | 149.5 | 150.0 | 150.4 | 44 | |
| | 43 | 143.2 | 143.8 | 144.4 | 144.9 | 145.4 | 146.0 | 146.5 | 146.9 | 147.4 | 147.9 | 148.4 | 148.8 | 149.3 | 149.7 | 150.1 | 43 | |
| | 42 | 142.7 | 143.3 | 143.9 | 144.5 | 145.0 | 145.5 | 146.0 | 146.6 | 147.1 | 147.6 | 148.0 | 148.5 | 149.0 | 149.4 | 149.9 | 42 | |
| | 41 | 142.2 | 142.8 | 143.4 | 144.0 | 144.5 | 145.1 | 145.6 | 146.2 | 146.7 | 147.2 | 147.7 | 148.2 | 148.6 | 149.1 | 149.6 | 41 | |
| | 49 | 144.8 | 145.3 | 145.7 | 146.2 | 146.6 | 147.0 | 147.4 | 147.8 | 148.3 | 148.7 | 149.0 | 149.4 | 149.8 | 150.1 | 150.5 | 49 | |
| | 48 | 144.4 | 144.9 | 145.4 | 145.8 | 146.3 | 146.7 | 147.1 | 147.6 | 148.0 | 148.4 | 148.8 | 149.2 | 149.5 | 149.9 | 150.3 | 48 | |
| | 47 | 144.0 | 144.5 | 145.0 | 145.5 | 145.9 | 146.4 | 146.8 | 147.2 | 147.7 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 47 | |
| | 46 | 143.5 | 144.1 | 144.6 | 145.0 | 145.5 | 146.0 | 146.5 | 146.9 | 147.4 | 147.8 | 148.2 | 148.6 | 149.1 | 149.5 | 149.9 | 46 | |
| 10-08 | 45 | 143.1 | 143.6 | 144.1 | 144.6 | 145.1 | 145.6 | 146.1 | 146.6 | 147.0 | 147.5 | 147.9 | 148.4 | 148.8 | 149.2 | 149.6 | 45 | 1-52 |
| | 44 | 142.6 | 143.1 | 143.7 | 144.2 | 144.7 | 145.2 | 145.7 | 146.2 | 146.7 | 147.2 | 147.6 | 148.1 | 148.5 | 148.9 | 149.4 | 44 | |
| | 43 | 142.1 | 142.6 | 143.2 | 143.8 | 144.3 | 144.8 | 145.4 | 145.8 | 146.3 | 146.8 | 147.3 | 147.8 | 148.2 | 148.7 | 149.1 | 43 | |
| | 42 | 141.5 | 142.2 | 142.7 | 143.3 | 143.9 | 144.4 | 144.9 | 145.5 | 146.0 | 146.5 | 147.0 | 147.5 | 147.9 | 148.4 | 148.8 | 42 | |
| | 41 | 141.0 | 141.6 | 142.2 | 142.8 | 143.4 | 144.0 | 144.5 | 145.1 | 145.6 | 146.1 | 146.6 | 147.1 | 147.6 | 148.1 | 148.5 | 41 | |
| | 49 | 143.7 | 144.2 | 144.6 | 145.1 | 145.5 | 146.0 | 146.4 | 146.8 | 147.2 | 147.6 | 148.0 | 148.4 | 148.8 | 149.2 | 149.5 | 49 | |
| | 48 | 143.3 | 143.8 | 144.2 | 144.7 | 145.2 | 145.6 | 146.1 | 146.5 | 146.9 | 147.3 | 147.7 | 148.1 | 148.5 | 148.9 | 149.3 | 48 | |
| | 47 | 142.8 | 143.4 | 143.9 | 144.3 | 144.8 | 145.3 | 145.7 | 146.2 | 146.6 | 147.0 | 147.5 | 147.9 | 148.3 | 148.7 | 149.1 | 47 | |
| | 46 | 142.4 | 142.9 | 143.4 | 143.9 | 144.4 | 144.9 | 145.4 | 145.8 | 146.3 | 146.8 | 147.2 | 147.6 | 148.0 | 148.5 | 148.9 | 46 | |
| 10-04 | 45 | 141.9 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 145.0 | 145.5 | 146.0 | 146.4 | 146.9 | 147.3 | 147.8 | 148.2 | 148.6 | 45 | 1-56 |
| | 44 | 141.4 | 142.0 | 142.5 | 143.1 | 143.6 | 144.1 | 144.6 | 145.1 | 145.6 | 146.1 | 146.6 | 147.0 | 147.5 | 147.9 | 148.4 | 44 | |
| | 43 | 140.9 | 141.5 | 142.1 | 142.6 | 143.2 | 143.7 | 144.3 | 144.8 | 145.3 | 145.8 | 146.2 | 146.7 | 147.2 | 147.6 | 148.1 | 43 | |
| | 42 | 140.4 | 141.0 | 141.6 | 142.2 | 142.7 | 143.3 | 143.8 | 144.4 | 144.9 | 145.4 | 145.9 | 146.4 | 146.9 | 147.4 | 147.8 | 42 | |
| | 41 | 139.8 | 140.5 | 141.1 | 141.7 | 142.3 | 142.9 | 143.4 | 144.0 | 144.5 | 145.0 | 145.6 | 146.1 | 146.6 | 147.1 | 147.5 | 41 | |
| | 49 | 142.6 | 143.1 | 143.5 | 144.0 | 144.5 | 144.9 | 145.3 | 145.8 | 146.2 | 146.6 | 147.0 | 147.4 | 147.8 | 148.2 | 148.5 | 49 | |
| | 48 | 142.2 | 142.7 | 143.1 | 143.6 | 144.1 | 144.6 | 145.0 | 145.4 | 145.9 | 146.3 | 146.7 | 147.1 | 147.5 | 147.9 | 148.3 | 48 | |
| | 47 | 141.7 | 142.2 | 142.7 | 143.2 | 143.7 | 144.2 | 144.7 | 145.1 | 145.6 | 146.0 | 146.4 | 146.9 | 147.3 | 147.7 | 148.1 | 47 | |
| | 46 | 141.3 | 141.8 | 142.3 | 142.8 | 143.3 | 143.8 | 144.3 | 144.8 | 145.3 | 145.7 | 146.2 | 146.6 | 147.0 | 147.5 | 147.9 | 46 | |
| 10-00 | 45 | 140.8 | 141.3 | 141.9 | 142.4 | 142.9 | 143.4 | 143.9 | 144.4 | 144.9 | 145.4 | 145.9 | 146.3 | 146.8 | 147.2 | 147.6 | 45 | 2-00 |
| | 44 | 140.3 | 140.9 | 141.4 | 142.0 | 142.5 | 143.0 | 143.6 | 144.1 | 144.6 | 145.1 | 145.5 | 146.0 | 146.5 | 146.9 | 147.4 | 44 | |
| | 43 | 139.8 | 140.4 | 141.0 | 141.5 | 142.1 | 142.6 | 143.2 | 143.7 | 144.2 | 144.7 | 145.2 | 145.7 | 146.2 | 146.6 | 147.1 | 43 | |
| | 42 | 139.2 | 139.8 | 140.5 | 141.1 | 141.6 | 142.2 | 142.8 | 143.3 | 143.8 | 144.4 | 144.9 | 145.4 | 145.9 | 146.4 | 146.8 | 42 | |
| | 41 | 138.7 | 139.3 | 139.9 | 140.6 | 141.2 | 141.8 | 142.3 | 142.9 | 143.4 | 144.0 | 144.5 | 145.0 | 145.5 | 146.0 | 146.5 | 41 | |
| | 49 | 141.5 | 142.0 | 142.4 | 142.9 | 143.4 | 143.8 | 144.3 | 144.7 | 145.1 | 145.6 | 146.0 | 146.4 | 146.8 | 147.2 | 147.6 | 49 | |
| | 48 | 141.1 | 141.6 | 142.0 | 142.5 | 143.0 | 143.5 | 143.9 | 144.4 | 144.7 | 145.3 | 145.6 | 146.1 | 146.5 | 147.0 | 147.4 | 48 | |
| | 47 | 140.6 | 141.1 | 141.6 | 142.2 | 142.6 | 143.1 | 143.6 | 144.1 | 144.5 | 145.0 | 145.4 | 145.9 | 146.3 | 146.7 | 147.1 | 47 | |
| | 46 | 140.1 | 140.7 | 141.2 | 141.7 | 142.3 | 142.8 | 143.3 | 143.7 | 144.2 | 144.7 | 145.1 | 145.6 | 146.0 | 146.5 | 146.9 | 46 | |
| 9-56 | 45 | 139.7 | 140.2 | 140.8 | 141.3 | 141.9 | 142.4 | 142.9 | 143.4 | 143.9 | 144.4 | 144.8 | 145.3 | 145.8 | 146.2 | 146.6 | 45 | 2-04 |
| | 44 | 139.1 | 139.7 | 140.3 | 140.9 | 141.4 | 142.0 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 145.0 | 145.5 | 145.9 | 146.4 | 44 | |
| | 43 | 138.6 | 139.2 | 139.8 | 140.4 | 141.0 | 141.6 | 142.1 | 142.6 | 143.2 | 143.7 | 144.2 | 144.7 | 145.2 | 145.6 | 146.1 | 43 | |
| | 42 | 138.1 | 138.7 | 139.3 | 140.0 | 140.5 | 141.1 | 141.7 | 142.2 | 142.8 | 143.3 | 143.8 | 144.4 | 144.9 | 145.4 | 145.8 | 42 | |
| | 41 | 137.5 | 138.2 | 138.8 | 139.5 | 140.1 | 140.7 | 141.2 | 141.8 | 142.4 | 142.9 | 143.5 | 144.0 | 144.5 | 145.0 | 145.5 | 41 | |
| | 49 | 140.4 | 140.9 | 141.4 | 141.8 | 142.3 | 142.8 | 143.2 | 143.7 | 144.1 | 144.5 | 145.0 | 145.4 | 145.8 | 146.2 | 146.6 | 49 | |
| | 48 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.4 | 142.9 | 143.4 | 143.8 | 144.3 | 144.7 | 145.1 | 145.6 | 146.0 | 146.4 | 48 | |
| | 47 | 139.5 | 140.0 | 140.6 | 141.1 | 141.6 | 142.1 | 142.6 | 143.0 | 143.5 | 144.0 | 144.4 | 144.9 | 145.3 | 145.7 | 146.2 | 47 | |
| | 46 | 139.0 | 139.6 | 140.1 | 140.7 | 141.2 | 141.7 | 142.2 | 142.7 | 143.2 | 143.7 | 144.1 | 144.6 | 145.0 | 145.5 | 145.9 | 46 | |
| 9-52 | 45 | 138.5 | 139.1 | 139.7 | 140.2 | 140.8 | 141.3 | 141.8 | 142.3 | 142.8 | 143.3 | 143.8 | 144.3 | 144.8 | 145.2 | 145.7 | 45 | 2-08 |
| | 44 | 138.0 | 138.6 | 139.2 | 139.8 | 140.4 | 140.9 | 141.4 | 142.0 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 144.9 | 145.4 | 44 | |
| | 43 | 137.5 | 138.1 | 138.7 | 139.3 | 139.9 | 140.5 | 141.0 | 141.6 | 142.1 | 142.6 | 143.2 | 143.7 | 144.2 | 144.7 | 145.1 | 43 | |
| | 42 | 137.0 | 137.6 | 138.2 | 138.9 | 139.5 | 140.0 | 140.6 | 141.2 | 141.7 | 142.3 | 142.8 | 143.4 | 143.9 | 144.4 | 144.9 | 42 | |
| | 41 | 136.4 | 137.1 | 137.7 | 138.4 | 139.0 | 139.6 | 140.2 | 140.8 | 141.3 | 141.9 | 142.5 | 143.0 | 143.5 | 144.1 | 144.6 | 41 | |
| | 49 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.7 | 142.2 | 142.6 | 143.1 | 143.5 | 144.0 | 144.4 | 144.8 | 145.2 | 145.6 | 49 | |
| | 48 | 138.9 | 139.4 | 139.9 | 140.4 | 140.9 | 141.4 | 141.9 | 142.3 | 142.8 | 143.3 | 143.7 | 144.2 | 144.6 | 145.0 | 145.4 | 48 | |
| | 47 | 138.4 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 143.0 | 143.4 | 143.9 | 144.3 | 144.8 | 145.2 | 47 | |
| | 46 | 137.9 | 138.5 | 139.1 | 139.6 | 140.1 | 140.7 | 141.2 | 141.7 | 142.2 | 142.6 | 143.1 | 143.6 | 144.1 | 144.5 | 145.0 | 46 | |
| 9-48 | 45 | 137.4 | 138.0 | 138.6 | 139.2 | 139.7 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.8 | 143.3 | 143.8 | 144.2 | 144.7 | 45 | 2-12 |
| | 44 | 136.9 | 137.5 | 138.1 | 138.7 | 139.3 | 139.8 | 140.4 | 140.9 | 141.5 | 142.0 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 44 | |
| | 43 | 136.4 | 137.0 | 137.7 | 138.3 | 138.9 | 139.4 | 140.0 | 140.6 | 141.1 | 141.6 | 142.2 | 142.7 | 143.2 | 143.7 | 144.2 | 43 | |
| | 42 | 135.9 | 136.5 | 137.1 | 137.8 | 138.4 | 139.0 | 139.6 | 140.1 | 140.7 | 141.3 | 141.8 | 142.4 | 142.9 | 143.4 | 143.9 | 42 | |
| | 41 | 135.3 | 136.0 | 136.6 | 137.3 | 137.9 | 138.5 | 139.1 | 139.7 | 140.3 | 140.9 | 141.4 | 142.0 | 142.5 | 143.1 | 143.6 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 153.8 | 154.2 | 154.5 | 154.8 | 155.1 | 155.4 | 155.7 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 158.0 | 49 | |
| | 48 | 153.6 | 154.0 | 154.3 | 154.6 | 155.0 | 155.3 | 155.6 | 155.9 | 156.2 | 156.5 | 156.8 | 157.1 | 157.4 | 157.7 | 158.0 | 48 | |
| | 47 | 153.5 | 153.8 | 154.1 | 154.5 | 154.8 | 155.1 | 155.4 | 155.8 | 156.1 | 156.4 | 156.7 | 157.0 | 157.3 | 157.6 | 157.9 | 47 | |
| | 46 | 153.2 | 153.6 | 154.0 | 154.3 | 154.6 | 155.0 | 155.3 | 155.6 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 157.5 | 157.8 | 46 | |
| 10-20 | 45 | 153.0 | 153.4 | 153.8 | 154.1 | 154.5 | 154.8 | 155.2 | 155.5 | 155.8 | 156.2 | 156.5 | 156.8 | 157.1 | 157.4 | 157.7 | 45 | 1-40 |
| | 44 | 152.8 | 153.2 | 153.6 | 153.9 | 154.3 | 154.6 | 155.0 | 155.3 | 155.7 | 156.0 | 156.4 | 156.7 | 157.0 | 157.3 | 157.7 | 44 | |
| | 43 | 152.6 | 153.0 | 153.3 | 153.7 | 154.1 | 154.5 | 154.8 | 155.2 | 155.5 | 155.9 | 156.2 | 156.6 | 156.9 | 157.2 | 157.6 | 43 | |
| | 42 | 152.3 | 152.7 | 153.1 | 153.5 | 153.9 | 154.3 | 154.7 | 155.0 | 155.3 | 155.7 | 156.1 | 156.4 | 156.8 | 157.1 | 157.5 | 42 | |
| | 41 | 152.1 | 152.5 | 152.9 | 153.3 | 153.7 | 154.1 | 154.5 | 154.8 | 155.2 | 155.6 | 156.0 | 156.3 | 156.7 | 157.0 | 157.4 | 41 | |
| | 49 | 152.8 | 153.2 | 153.5 | 153.8 | 154.1 | 154.5 | 154.8 | 155.1 | 155.4 | 155.7 | 156.0 | 156.3 | 156.6 | 156.9 | 157.2 | 49 | |
| | 48 | 152.6 | 153.0 | 153.3 | 153.7 | 154.0 | 154.3 | 154.7 | 155.0 | 155.3 | 155.6 | 155.9 | 156.2 | 156.5 | 156.8 | 157.1 | 48 | |
| | 47 | 152.5 | 152.8 | 153.1 | 153.5 | 153.8 | 154.2 | 154.5 | 154.8 | 155.2 | 155.5 | 155.8 | 156.1 | 156.4 | 156.7 | 157.1 | 47 | |
| | 46 | 152.2 | 152.6 | 153.0 | 153.3 | 153.7 | 154.0 | 154.4 | 154.7 | 155.0 | 155.4 | 155.7 | 156.0 | 156.3 | 156.7 | 157.0 | 46 | |
| 10-16 | 45 | 152.0 | 152.4 | 152.8 | 153.1 | 153.5 | 153.9 | 154.2 | 154.6 | 154.9 | 155.2 | 155.6 | 155.9 | 156.2 | 156.6 | 156.9 | 45 | 1-44 |
| | 44 | 151.8 | 152.2 | 152.6 | 152.9 | 153.3 | 153.7 | 154.0 | 154.4 | 154.8 | 155.1 | 155.5 | 155.8 | 156.1 | 156.5 | 156.8 | 44 | |
| | 43 | 151.5 | 152.0 | 152.4 | 152.8 | 153.1 | 153.5 | 153.9 | 154.2 | 154.6 | 155.0 | 155.3 | 155.7 | 156.0 | 156.4 | 156.7 | 43 | |
| | 42 | 151.3 | 151.7 | 152.1 | 152.5 | 152.9 | 153.3 | 153.7 | 154.1 | 154.4 | 154.8 | 155.2 | 155.5 | 155.9 | 156.3 | 156.6 | 42 | |
| | 41 | 151.0 | 151.5 | 151.9 | 152.3 | 152.7 | 153.1 | 153.5 | 153.9 | 154.3 | 154.7 | 155.0 | 155.4 | 155.8 | 156.1 | 156.5 | 41 | |
| | 49 | 151.8 | 152.2 | 152.5 | 152.9 | 153.2 | 153.5 | 153.9 | 154.2 | 154.5 | 154.8 | 155.1 | 155.4 | 155.7 | 156.0 | 156.3 | 49 | |
| | 48 | 151.7 | 152.0 | 152.4 | 152.7 | 153.1 | 153.4 | 153.7 | 154.0 | 154.4 | 154.7 | 155.0 | 155.3 | 155.6 | 156.0 | 156.3 | 48 | |
| | 47 | 151.5 | 151.8 | 152.2 | 152.5 | 152.9 | 153.2 | 153.6 | 153.9 | 154.3 | 154.6 | 154.9 | 155.2 | 155.6 | 155.9 | 156.2 | 47 | |
| | 46 | 151.2 | 151.6 | 152.0 | 152.4 | 152.7 | 153.1 | 153.4 | 153.8 | 154.1 | 154.5 | 154.8 | 155.1 | 155.5 | 155.8 | 156.1 | 46 | |
| 10-12 | 45 | 151.0 | 151.4 | 151.8 | 152.2 | 152.5 | 152.9 | 153.3 | 153.6 | 154.0 | 154.3 | 154.7 | 155.0 | 155.4 | 155.7 | 156.0 | 45 | 1-48 |
| | 44 | 150.8 | 151.2 | 151.6 | 152.0 | 152.4 | 152.7 | 153.1 | 153.5 | 153.9 | 154.2 | 154.6 | 154.9 | 155.3 | 155.6 | 156.0 | 44 | |
| | 43 | 150.5 | 151.0 | 151.4 | 151.8 | 152.2 | 152.6 | 152.9 | 153.3 | 153.7 | 154.1 | 154.4 | 154.8 | 155.2 | 155.5 | 155.9 | 43 | |
| | 42 | 150.3 | 150.7 | 151.1 | 151.6 | 152.0 | 152.4 | 152.8 | 153.1 | 153.5 | 153.9 | 154.3 | 154.7 | 155.0 | 155.4 | 155.8 | 42 | |
| | 41 | 150.0 | 150.5 | 150.9 | 151.3 | 151.7 | 152.2 | 152.6 | 153.0 | 153.4 | 153.7 | 154.1 | 154.5 | 154.9 | 155.3 | 155.6 | 41 | |
| | 49 | 150.9 | 151.2 | 151.6 | 151.9 | 152.3 | 152.6 | 152.9 | 153.3 | 153.6 | 153.9 | 154.2 | 154.5 | 154.9 | 155.2 | 155.5 | 49 | |
| | 48 | 150.7 | 151.0 | 151.4 | 151.7 | 152.1 | 152.5 | 152.8 | 153.1 | 153.5 | 153.8 | 154.1 | 154.5 | 154.8 | 155.1 | 155.4 | 48 | |
| | 47 | 150.5 | 150.8 | 151.2 | 151.6 | 151.9 | 152.3 | 152.7 | 153.0 | 153.4 | 153.7 | 154.0 | 154.4 | 154.7 | 155.0 | 155.4 | 47 | |
| | 46 | 150.3 | 150.6 | 151.0 | 151.4 | 151.8 | 152.1 | 152.5 | 152.9 | 153.2 | 153.6 | 153.9 | 154.3 | 154.6 | 155.0 | 155.3 | 46 | |
| 10-08 | 45 | 150.0 | 150.4 | 150.8 | 151.2 | 151.6 | 152.0 | 152.3 | 152.7 | 153.1 | 153.4 | 153.8 | 154.2 | 154.5 | 154.9 | 155.2 | 45 | 1-52 |
| | 44 | 149.8 | 150.2 | 150.6 | 151.0 | 151.4 | 151.8 | 152.2 | 152.6 | 152.9 | 153.3 | 153.7 | 154.0 | 154.4 | 154.8 | 155.1 | 44 | |
| | 43 | 149.5 | 150.0 | 150.4 | 150.8 | 151.2 | 151.6 | 152.0 | 152.4 | 152.8 | 153.2 | 153.5 | 153.9 | 154.3 | 154.7 | 155.0 | 43 | |
| | 42 | 149.3 | 149.7 | 150.2 | 150.6 | 151.0 | 151.4 | 151.8 | 152.3 | 152.6 | 153.0 | 153.4 | 153.8 | 154.2 | 154.5 | 154.9 | 42 | |
| | 41 | 149.0 | 149.5 | 149.9 | 150.3 | 150.8 | 151.2 | 151.6 | 152.0 | 152.5 | 152.8 | 153.2 | 153.6 | 154.0 | 154.4 | 154.8 | 41 | |
| | 49 | 149.9 | 150.2 | 150.6 | 151.0 | 151.3 | 151.7 | 152.0 | 152.3 | 152.7 | 153.0 | 153.3 | 153.7 | 154.0 | 154.3 | 154.7 | 49 | |
| | 48 | 149.7 | 150.1 | 150.4 | 150.8 | 151.2 | 151.5 | 151.9 | 152.2 | 152.6 | 152.9 | 153.3 | 153.6 | 153.9 | 154.3 | 154.6 | 48 | |
| | 47 | 149.5 | 149.9 | 150.3 | 150.6 | 151.0 | 151.4 | 151.7 | 152.1 | 152.5 | 152.8 | 153.1 | 153.5 | 153.8 | 154.2 | 154.5 | 47 | |
| | 46 | 149.3 | 149.7 | 150.1 | 150.5 | 150.8 | 151.2 | 151.6 | 152.0 | 152.3 | 152.7 | 153.0 | 153.4 | 153.8 | 154.1 | 154.5 | 46 | |
| 10-04 | 45 | 149.0 | 149.5 | 149.9 | 150.3 | 150.6 | 151.0 | 151.4 | 151.8 | 152.2 | 152.5 | 152.9 | 153.3 | 153.6 | 154.0 | 154.4 | 45 | 1-56 |
| | 44 | 148.8 | 149.2 | 149.6 | 150.1 | 150.5 | 150.9 | 151.3 | 151.7 | 152.0 | 152.4 | 152.8 | 153.2 | 153.5 | 153.9 | 154.3 | 44 | |
| | 43 | 148.6 | 149.0 | 149.4 | 149.9 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 152.3 | 152.7 | 153.0 | 153.4 | 153.8 | 154.2 | 43 | |
| | 42 | 148.3 | 148.7 | 149.2 | 149.6 | 150.1 | 150.5 | 150.9 | 151.3 | 151.7 | 152.1 | 152.5 | 152.9 | 153.3 | 153.7 | 154.1 | 42 | |
| | 41 | 148.0 | 148.5 | 148.9 | 149.4 | 149.8 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 152.4 | 152.8 | 153.2 | 153.6 | 154.0 | 41 | |
| | 49 | 148.9 | 149.3 | 149.7 | 150.0 | 150.4 | 150.7 | 151.1 | 151.5 | 151.8 | 152.1 | 152.5 | 152.8 | 153.2 | 153.5 | 153.8 | 49 | |
| | 48 | 148.7 | 149.1 | 149.5 | 149.9 | 150.2 | 150.6 | 151.0 | 151.3 | 151.7 | 152.0 | 152.4 | 152.7 | 153.1 | 153.4 | 153.8 | 48 | |
| | 47 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 150.4 | 150.8 | 151.2 | 151.6 | 151.9 | 152.3 | 152.6 | 153.0 | 153.4 | 153.7 | 47 | |
| | 46 | 148.3 | 148.7 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.1 | 151.4 | 151.8 | 152.2 | 152.5 | 152.9 | 153.3 | 153.6 | 46 | |
| 10-00 | 45 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 150.5 | 150.9 | 151.3 | 151.7 | 152.0 | 152.4 | 152.8 | 153.2 | 153.5 | 45 | 2-00 |
| | 44 | 147.8 | 148.3 | 148.7 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 152.3 | 152.7 | 153.1 | 153.4 | 44 | |
| | 43 | 147.6 | 148.0 | 148.5 | 148.9 | 149.3 | 149.7 | 150.2 | 150.6 | 151.0 | 151.4 | 151.8 | 152.2 | 152.6 | 153.0 | 153.3 | 43 | |
| | 42 | 147.3 | 147.8 | 148.2 | 148.7 | 149.1 | 149.5 | 150.0 | 150.4 | 150.8 | 151.2 | 151.6 | 152.0 | 152.4 | 152.8 | 153.2 | 42 | |
| | 41 | 147.0 | 147.5 | 148.0 | 148.4 | 148.9 | 149.3 | 149.8 | 150.2 | 150.6 | 151.1 | 151.5 | 151.9 | 152.3 | 152.7 | 153.1 | 41 | |
| | 49 | 148.0 | 418.3 | 148.7 | 149.1 | 149.5 | 149.8 | 150.2 | 150.5 | 150.9 | 151.3 | 151.6 | 152.0 | 152.3 | 152.6 | 153.0 | 49 | |
| | 48 | 147.8 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 150.4 | 150.8 | 151.2 | 151.5 | 151.9 | 152.2 | 152.6 | 152.9 | 48 | |
| | 47 | 147.5 | 147.9 | 148.4 | 148.8 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.0 | 151.4 | 151.8 | 152.1 | 152.5 | 152.9 | 47 | |
| | 46 | 147.3 | 147.7 | 148.2 | 148.6 | 149.0 | 149.4 | 149.8 | 150.2 | 150.5 | 150.9 | 151.3 | 151.7 | 152.0 | 152.4 | 152.9 | 46 | |
| 9-56 | 45 | 147.1 | 147.5 | 147.9 | 148.4 | 148.8 | 149.2 | 149.6 | 150.0 | 150.4 | 150.8 | 151.2 | 151.6 | 151.9 | 152.3 | 152.7 | 45 | 2-04 |
| | 44 | 146.9 | 147.3 | 147.7 | 148.2 | 148.6 | 149.0 | 149.4 | 149.8 | 150.2 | 150.6 | 151.0 | 151.4 | 151.8 | 152.2 | 152.6 | 44 | |
| | 43 | 146.6 | 147.1 | 147.5 | 148.0 | 148.4 | 148.8 | 149.2 | 149.7 | 150.1 | 150.5 | 150.9 | 151.3 | 151.7 | 152.1 | 152.5 | 43 | |
| | 42 | 146.3 | 146.8 | 147.3 | 147.7 | 148.2 | 148.6 | 149.1 | 149.5 | 149.9 | 150.3 | 150.8 | 151.2 | 151.6 | 152.0 | 152.4 | 42 | |
| | 41 | 146.0 | 146.5 | 147.0 | 147.5 | 147.9 | 148.4 | 148.9 | 149.3 | 149.7 | 150.2 | 150.6 | 151.0 | 151.5 | 151.9 | 152.3 | 41 | |
| | 49 | 147.0 | 147.4 | 147.8 | 148.2 | 148.5 | 148.9 | 149.3 | 149.7 | 150.0 | 150.4 | 150.7 | 151.1 | 151.5 | 151.8 | 152.2 | 49 | |
| | 48 | 146.8 | 147.2 | 147.6 | 148.0 | 148.4 | 148.8 | 149.2 | 149.5 | 149.9 | 150.3 | 150.6 | 151.0 | 151.4 | 151.7 | 152.1 | 48 | |
| | 47 | 146.6 | 147.0 | 147.4 | 147.8 | 148.2 | 148.6 | 149.0 | 149.4 | 149.8 | 150.2 | 150.5 | 150.9 | 151.3 | 151.7 | 152.0 | 47 | |
| | 46 | 146.4 | 146.8 | 147.2 | 147.6 | 148.0 | 148.5 | 148.9 | 149.3 | 149.7 | 150.0 | 150.4 | 150.8 | 151.2 | 151.6 | 152.0 | 46 | |
| 9-52 | 45 | 146.1 | 146.6 | 147.0 | 147.4 | 147.9 | 148.3 | 148.7 | 149.1 | 149.5 | 149.9 | 150.3 | 150.7 | 151.1 | 151.5 | 151.9 | 45 | 2-08 |
| | 44 | 145.9 | 146.3 | 146.8 | 147.2 | 147.7 | 148.1 | 148.5 | 148.9 | 149.4 | 149.8 | 150.2 | 150.6 | 151.0 | 151.4 | 151.8 | 44 | |
| | 43 | 145.6 | 146.1 | 146.6 | 147.0 | 147.5 | 147.9 | 148.3 | 148.8 | 149.2 | 149.6 | 150.0 | 150.5 | 150.9 | 151.3 | 151.7 | 43 | |
| | 42 | 145.4 | 145.8 | 146.3 | 146.8 | 147.2 | 147.7 | 148.2 | 148.6 | 149.0 | 149.5 | 149.9 | 150.3 | 150.7 | 151.2 | 151.6 | 42 | |
| | 41 | 145.1 | 145.6 | 146.0 | 146.5 | 147.0 | 147.5 | 147.9 | 148.4 | 148.9 | 149.3 | 149.7 | 150.2 | 150.6 | 151.0 | 151.5 | 41 | |
| | 49 | 146.0 | 146.4 | 146.8 | 147.2 | 147.6 | 148.0 | 148.4 | 148.8 | 149.1 | 149.5 | 149.9 | 150.3 | 150.6 | 151.0 | 151.3 | 49 | |
| | 48 | 145.8 | 146.3 | 146.7 | 147.1 | 147.5 | 147.9 | 148.3 | 148.7 | 149.0 | 149.4 | 149.8 | 150.2 | 150.5 | 150.9 | 151.3 | 48 | |
| | 47 | 145.6 | 146.0 | 146.5 | 146.9 | 147.3 | 147.7 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 150.5 | 150.8 | 151.2 | 47 | |
| | 46 | 145.4 | 145.8 | 146.3 | 146.7 | 147.1 | 147.6 | 148.0 | 148.4 | 148.8 | 149.2 | 149.6 | 150.0 | 150.4 | 150.8 | 151.1 | 46 | |
| 9-48 | 45 | 145.2 | 145.6 | 146.1 | 146.5 | 146.9 | 147.4 | 147.8 | 148.2 | 148.6 | 149.0 | 149.4 | 149.9 | 150.3 | 150.7 | 151.1 | 45 | 2-12 |
| | 44 | 144.9 | 145.4 | 145.8 | 146.3 | 146.7 | 147.2 | 147.6 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.2 | 150.6 | 151.0 | 44 | |
| | 43 | 144.7 | 145.1 | 145.6 | 146.1 | 146.5 | 147.0 | 147.4 | 147.9 | 148.3 | 148.8 | 149.2 | 149.6 | 150.0 | 150.5 | 150.9 | 43 | |
| | 42 | 144.4 | 144.9 | 145.4 | 145.8 | 146.3 | 146.8 | 147.3 | 147.7 | 148.2 | 148.6 | 149.0 | 149.5 | 149.9 | 150.3 | 150.8 | 42 | |
| | 41 | 144.1 | 144.6 | 145.1 | 145.6 | 146.1 | 146.6 | 147.0 | 147.5 | 148.0 | 148.4 | 148.9 | 149.3 | 149.8 | 150.2 | 150.7 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.7 | 142.2 | 142.6 | 143.1 | 143.5 | 144.0 | 144.4 | 144.8 | 145.2 | 145.6 | 49 | |
| | 48 | 138.9 | 139.4 | 139.9 | 140.4 | 140.9 | 141.4 | 141.9 | 142.3 | 142.8 | 143.3 | 143.7 | 144.2 | 144.6 | 145.0 | 145.4 | 48 | |
| | 47 | 138.4 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 143.0 | 143.4 | 143.9 | 144.3 | 144.8 | 145.2 | 47 | |
| | 46 | 137.9 | 138.5 | 139.1 | 139.6 | 140.1 | 140.7 | 141.2 | 141.7 | 142.2 | 142.6 | 143.1 | 143.6 | 144.1 | 144.5 | 145.0 | 46 | |
| 9-48 | 45 | 137.4 | 138.0 | 138.6 | 139.2 | 139.7 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.8 | 143.3 | 143.8 | 144.2 | 144.7 | 45 | 2-12 |
| | 44 | 136.9 | 137.5 | 138.1 | 138.7 | 139.3 | 139.8 | 140.4 | 140.9 | 141.5 | 142.0 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 44 | |
| | 43 | 136.4 | 137.0 | 137.7 | 138.3 | 138.9 | 139.4 | 140.0 | 140.6 | 141.1 | 141.6 | 142.2 | 142.7 | 143.2 | 143.7 | 144.2 | 43 | |
| | 42 | 135.9 | 136.5 | 137.1 | 137.8 | 138.4 | 139.0 | 139.6 | 140.1 | 140.7 | 141.3 | 141.8 | 142.4 | 142.9 | 143.4 | 143.9 | 42 | |
| | 41 | 135.3 | 136.0 | 136.6 | 137.3 | 137.9 | 138.5 | 139.1 | 139.7 | 140.3 | 140.9 | 141.4 | 142.0 | 142.5 | 143.1 | 143.6 | 41 | |
| | 49 | 138.2 | 138.7 | 139.3 | 139.7 | 140.2 | 140.7 | 141.2 | 141.6 | 142.1 | 142.5 | 143.0 | 143.4 | 143.9 | 144.3 | 144.7 | 49 | |
| | 48 | 137.8 | 138.3 | 138.8 | 139.4 | 139.9 | 140.4 | 140.8 | 141.3 | 141.8 | 142.3 | 142.7 | 143.2 | 143.6 | 144.0 | 144.5 | 48 | |
| | 47 | 137.3 | 137.9 | 138.4 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.4 | 142.9 | 143.3 | 143.8 | 144.3 | 47 | |
| | 46 | 136.8 | 137.4 | 138.0 | 138.5 | 139.1 | 139.6 | 140.1 | 140.7 | 141.2 | 141.6 | 142.1 | 142.6 | 143.1 | 143.5 | 144.0 | 46 | |
| 9-44 | 45 | 136.4 | 137.0 | 137.5 | 138.1 | 138.7 | 139.2 | 139.8 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.8 | 143.3 | 143.7 | 45 | 2-16 |
| | 44 | 135.8 | 136.5 | 137.1 | 137.7 | 138.2 | 138.8 | 139.4 | 139.9 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 143.0 | 143.5 | 44 | |
| | 43 | 135.3 | 136.0 | 136.6 | 137.2 | 137.8 | 138.4 | 139.0 | 139.5 | 140.1 | 140.6 | 141.2 | 141.7 | 142.2 | 142.7 | 143.2 | 43 | |
| | 42 | 134.8 | 135.4 | 136.1 | 136.7 | 137.3 | 138.0 | 138.5 | 139.1 | 139.7 | 140.3 | 140.8 | 141.4 | 141.9 | 142.4 | 142.9 | 42 | |
| | 41 | 134.2 | 134.9 | 135.6 | 136.2 | 136.9 | 137.5 | 138.1 | 138.7 | 139.3 | 139.9 | 140.4 | 141.0 | 141.5 | 142.0 | 142.6 | 41 | |
| | 49 | 137.2 | 137.7 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 140.6 | 141.1 | 141.5 | 142.0 | 142.4 | 142.9 | 143.3 | 143.7 | 49 | |
| | 48 | 136.7 | 137.3 | 137.8 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.7 | 142.2 | 142.6 | 143.1 | 143.5 | 48 | |
| | 47 | 136.3 | 136.8 | 137.4 | 137.9 | 138.4 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.4 | 141.9 | 142.4 | 142.8 | 143.3 | 47 | |
| | 46 | 135.8 | 136.4 | 136.9 | 137.5 | 138.0 | 138.6 | 139.1 | 139.6 | 140.1 | 140.6 | 141.1 | 141.6 | 142.1 | 142.6 | 143.1 | 46 | |
| 9-40 | 45 | 135.3 | 135.9 | 136.5 | 137.1 | 137.6 | 138.2 | 138.7 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.8 | 45 | 2-20 |
| | 44 | 134.8 | 135.4 | 136.0 | 136.6 | 137.2 | 137.8 | 138.3 | 138.9 | 139.4 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 44 | |
| | 43 | 134.3 | 134.9 | 135.5 | 136.2 | 136.8 | 137.4 | 137.9 | 138.5 | 139.1 | 139.6 | 140.2 | 140.7 | 141.2 | 141.8 | 142.3 | 43 | |
| | 42 | 133.7 | 134.4 | 135.0 | 135.7 | 136.3 | 136.9 | 137.5 | 138.1 | 138.7 | 139.3 | 139.8 | 140.4 | 140.9 | 141.5 | 142.0 | 42 | |
| | 41 | 133.1 | 133.8 | 134.5 | 135.2 | 135.8 | 136.5 | 137.1 | 137.7 | 138.3 | 138.9 | 139.5 | 140.0 | 140.6 | 141.1 | 141.7 | 41 | |
| | 49 | 136.1 | 136.6 | 137.2 | 137.7 | 138.2 | 138.7 | 139.1 | 139.6 | 140.1 | 140.6 | 141.0 | 141.5 | 141.9 | 142.4 | 142.8 | 49 | |
| | 48 | 135.7 | 136.2 | 136.7 | 137.3 | 137.8 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.8 | 141.2 | 141.7 | 142.1 | 162.6 | 48 | |
| | 47 | 135.2 | 135.8 | 136.3 | 136.9 | 137.4 | 137.9 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.4 | 141.9 | 142.3 | 47 | |
| | 46 | 134.7 | 135.3 | 135.9 | 136.5 | 137.0 | 137.6 | 138.1 | 138.6 | 139.2 | 139.7 | 140.2 | 140.7 | 141.2 | 141.6 | 142.1 | 46 | |
| 9-36 | 45 | 134.2 | 134.8 | 135.4 | 136.0 | 136.6 | 137.2 | 137.7 | 138.3 | 138.8 | 139.3 | 139.9 | 140.4 | 140.9 | 141.4 | 141.9 | 45 | 2-24 |
| | 44 | 133.7 | 134.3 | 135.0 | 135.6 | 136.2 | 136.8 | 137.3 | 137.9 | 138.4 | 139.0 | 139.5 | 140.1 | 140.6 | 141.2 | 141.7 | 44 | |
| | 43 | 133.2 | 133.8 | 134.5 | 135.1 | 135.7 | 136.3 | 136.9 | 137.5 | 138.1 | 138.6 | 139.2 | 139.7 | 140.3 | 140.8 | 141.3 | 43 | |
| | 42 | 132.7 | 133.3 | 134.0 | 134.6 | 135.3 | 135.9 | 136.5 | 137.1 | 137.7 | 138.3 | 138.8 | 139.4 | 140.0 | 140.5 | 141.0 | 42 | |
| | 41 | 132.1 | 132.8 | 133.5 | 134.1 | 134.8 | 135.4 | 136.1 | 136.7 | 137.3 | 137.9 | 138.5 | 139.1 | 139.6 | 140.2 | 140.7 | 41 | |
| | 49 | 135.1 | 135.6 | 136.1 | 136.6 | 137.2 | 137.6 | 138.1 | 138.6 | 139.1 | 139.6 | 140.1 | 140.5 | 141.0 | 141.4 | 141.9 | 49 | |
| | 48 | 134.6 | 135.2 | 135.7 | 136.2 | 136.8 | 137.3 | 137.8 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.7 | 141.2 | 141.7 | 48 | |
| | 47 | 134.1 | 134.7 | 135.3 | 135.8 | 136.4 | 136.9 | 137.5 | 138.0 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 140.9 | 141.4 | 47 | |
| | 46 | 133.7 | 134.3 | 134.9 | 135.4 | 136.0 | 136.6 | 137.1 | 137.6 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 140.7 | 141.2 | 46 | |
| 9-32 | 45 | 133.2 | 133.8 | 134.4 | 135.0 | 135.6 | 136.2 | 136.7 | 137.3 | 137.8 | 138.4 | 138.9 | 139.4 | 139.9 | 140.4 | 140.9 | 45 | 2-28 |
| | 44 | 132.7 | 133.3 | 133.9 | 134.6 | 135.2 | 135.8 | 136.3 | 136.9 | 137.5 | 138.0 | 138.6 | 139.1 | 139.6 | 140.1 | 140.7 | 44 | |
| | 43 | 132.2 | 132.8 | 133.5 | 134.1 | 134.7 | 135.3 | 135.9 | 136.5 | 137.1 | 137.7 | 138.2 | 138.8 | 139.3 | 139.9 | 140.4 | 43 | |
| | 42 | 131.6 | 132.3 | 133.0 | 133.6 | 134.3 | 134.9 | 135.5 | 136.1 | 136.7 | 137.3 | 137.9 | 138.4 | 139.0 | 139.6 | 140.1 | 42 | |
| | 41 | 131.0 | 131.7 | 132.4 | 133.1 | 133.8 | 134.4 | 135.1 | 135.7 | 136.3 | 136.9 | 137.5 | 138.1 | 138.7 | 139.2 | 139.8 | 41 | |
| | 49 | 134.0 | 134.6 | 135.1 | 135.6 | 136.1 | 136.6 | 137.2 | 137.7 | 138.1 | 138.6 | 139.1 | 139.6 | 140.0 | 140.5 | 140.9 | 49 | |
| | 48 | 133.4 | 134.1 | 134.7 | 135.2 | 135.8 | 136.3 | 136.8 | 137.3 | 137.8 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.7 | 48 | |
| | 47 | 133.1 | 133.7 | 134.3 | 134.8 | 135.4 | 135.9 | 136.5 | 137.0 | 137.5 | 138.0 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 47 | |
| | 46 | 132.6 | 133.3 | 133.8 | 134.4 | 135.0 | 135.6 | 136.1 | 136.7 | 137.2 | 137.7 | 138.2 | 138.8 | 139.3 | 139.8 | 140.3 | 46 | |
| 9-28 | 45 | 132.1 | 132.8 | 133.4 | 134.0 | 134.6 | 135.2 | 135.7 | 136.3 | 136.9 | 137.4 | 137.9 | 138.5 | 139.0 | 139.5 | 140.0 | 45 | 2-32 |
| | 44 | 131.6 | 132.3 | 132.9 | 133.5 | 134.2 | 134.8 | 135.4 | 135.9 | 136.5 | 137.0 | 137.6 | 138.1 | 138.7 | 139.2 | 139.7 | 44 | |
| | 43 | 131.1 | 131.8 | 132.4 | 133.1 | 133.7 | 134.3 | 134.9 | 135.5 | 136.1 | 136.7 | 137.3 | 137.8 | 138.4 | 138.9 | 139.5 | 43 | |
| | 42 | 130.6 | 131.3 | 131.9 | 132.6 | 133.3 | 133.9 | 134.5 | 135.1 | 135.7 | 136.3 | 136.9 | 137.5 | 138.1 | 138.6 | 139.2 | 42 | |
| | 41 | 130.0 | 130.7 | 131.4 | 132.1 | 132.8 | 133.5 | 134.1 | 134.7 | 135.3 | 136.0 | 136.6 | 137.2 | 137.7 | 138.3 | 138.9 | 41 | |
| | 49 | 133.0 | 133.5 | 134.1 | 134.6 | 135.1 | 135.7 | 136.2 | 136.7 | 137.2 | 137.7 | 138.1 | 138.6 | 139.1 | 139.6 | 140.0 | 49 | |
| | 48 | 132.5 | 133.1 | 133.7 | 134.2 | 134.8 | 135.3 | 135.8 | 136.4 | 136.9 | 137.4 | 137.9 | 138.4 | 138.9 | 139.3 | 139.8 | 48 | |
| | 47 | 132.1 | 132.7 | 133.3 | 133.8 | 134.4 | 135.0 | 135.5 | 136.0 | 136.6 | 137.1 | 137.6 | 138.1 | 138.6 | 139.1 | 139.6 | 47 | |
| | 46 | 131.6 | 132.2 | 132.8 | 133.4 | 134.0 | 134.6 | 135.1 | 135.7 | 136.2 | 136.8 | 137.3 | 137.8 | 138.3 | 138.8 | 139.3 | 46 | |
| 9-24 | 45 | 131.1 | 131.8 | 132.4 | 133.0 | 133.6 | 134.2 | 134.8 | 135.3 | 135.9 | 136.4 | 137.0 | 137.5 | 138.0 | 138.6 | 139.1 | 45 | 2-36 |
| | 44 | 130.6 | 131.3 | 131.9 | 132.5 | 133.2 | 133.8 | 134.4 | 135.0 | 135.5 | 136.1 | 136.6 | 137.2 | 137.8 | 138.3 | 138.8 | 44 | |
| | 43 | 130.1 | 130.8 | 131.4 | 132.1 | 132.7 | 133.3 | 134.0 | 134.6 | 135.2 | 135.7 | 136.3 | 136.9 | 137.4 | 138.0 | 138.6 | 43 | |
| | 42 | 129.6 | 130.3 | 131.0 | 131.6 | 132.3 | 132.9 | 133.6 | 134.2 | 134.8 | 135.4 | 136.0 | 136.6 | 137.1 | 137.7 | 138.3 | 42 | |
| | 41 | 129.0 | 129.7 | 130.4 | 131.1 | 131.8 | 132.5 | 133.1 | 133.8 | 134.4 | 135.0 | 135.6 | 136.2 | 136.8 | 137.4 | 138.0 | 41 | |
| | 49 | 132.0 | 132.5 | 133.1 | 133.6 | 134.2 | 134.7 | 135.2 | 135.7 | 136.2 | 136.7 | 137.2 | 137.7 | 138.2 | 138.6 | 139.1 | 49 | |
| | 48 | 131.5 | 132.1 | 132.7 | 133.2 | 133.8 | 134.3 | 134.9 | 135.4 | 135.9 | 136.4 | 136.9 | 137.4 | 137.9 | 138.4 | 138.9 | 48 | |
| | 47 | 131.1 | 131.7 | 132.3 | 132.8 | 133.4 | 134.0 | 134.5 | 135.1 | 135.6 | 136.1 | 136.6 | 137.2 | 137.7 | 138.2 | 138.7 | 47 | |
| | 46 | 130.6 | 131.2 | 131.8 | 132.4 | 133.0 | 133.6 | 134.2 | 134.7 | 135.3 | 135.8 | 136.3 | 136.9 | 137.4 | 137.9 | 138.4 | 46 | |
| 9-20 | 45 | 130.1 | 130.8 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 134.4 | 134.9 | 135.5 | 136.0 | 136.6 | 137.1 | 137.6 | 138.2 | 45 | 2-40 |
| | 44 | 129.6 | 130.3 | 130.9 | 131.6 | 132.2 | 132.8 | 133.4 | 134.0 | 134.6 | 135.2 | 135.7 | 136.3 | 136.8 | 137.4 | 137.9 | 44 | |
| | 43 | 129.1 | 129.8 | 130.5 | 131.1 | 131.8 | 132.4 | 133.0 | 133.6 | 134.2 | 134.8 | 135.4 | 136.0 | 136.5 | 137.1 | 137.6 | 43 | |
| | 42 | 128.6 | 129.3 | 130.0 | 130.6 | 131.3 | 132.0 | 132.6 | 133.2 | 133.8 | 134.4 | 135.0 | 135.6 | 136.2 | 136.8 | 137.4 | 42 | |
| | 41 | 128.0 | 128.7 | 129.5 | 130.2 | 130.8 | 131.5 | 132.2 | 132.8 | 133.4 | 134.1 | 134.7 | 135.3 | 135.9 | 136.5 | 137.1 | 41 | |
| | 49 | 131.0 | 131.5 | 132.1 | 132.6 | 133.2 | 133.7 | 134.2 | 134.7 | 135.3 | 135.8 | 136.3 | 136.7 | 137.2 | 137.7 | 138.2 | 49 | |
| | 48 | 130.5 | 131.1 | 131.7 | 132.2 | 132.8 | 133.4 | 133.9 | 134.4 | 135.0 | 135.5 | 136.0 | 136.5 | 137.0 | 137.5 | 138.0 | 48 | |
| | 47 | 130.1 | 130.7 | 131.3 | 131.9 | 132.4 | 133.0 | 133.6 | 134.1 | 134.7 | 135.2 | 135.7 | 136.2 | 136.7 | 137.2 | 137.7 | 47 | |
| | 46 | 129.6 | 130.2 | 130.8 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 134.3 | 134.9 | 135.4 | 135.9 | 136.5 | 137.0 | 137.5 | 46 | |
| 9-16 | 45 | 129.1 | 129.8 | 130.4 | 131.0 | 131.6 | 132.2 | 132.8 | 133.4 | 134.0 | 134.6 | 135.1 | 135.7 | 136.2 | 136.7 | 137.3 | 45 | 2-44 |
| | 44 | 128.6 | 129.3 | 129.9 | 130.6 | 131.2 | 131.8 | 132.5 | 133.0 | 133.6 | 134.2 | 134.8 | 135.4 | 135.9 | 136.5 | 137.0 | 44 | |
| | 43 | 128.1 | 128.8 | 129.5 | 130.1 | 130.8 | 131.4 | 132.0 | 132.7 | 133.3 | 133.9 | 134.5 | 135.0 | 135.6 | 136.2 | 136.7 | 43 | |
| | 42 | 127.6 | 128.3 | 129.0 | 129.7 | 130.3 | 131.0 | 131.6 | 132.3 | 132.9 | 133.5 | 134.1 | 134.7 | 135.3 | 135.9 | 136.5 | 42 | |
| | 41 | 127.0 | 127.8 | 128.5 | 129.2 | 129.9 | 130.6 | 131.2 | 131.9 | 132.5 | 133.1 | 133.8 | 134.4 | 135.0 | 135.6 | 136.2 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 146.0 | 146.4 | 146.8 | 147.2 | 147.6 | 148.0 | 148.4 | 148.8 | 149.1 | 149.5 | 149.9 | 150.3 | 150.6 | 151.0 | 151.3 | 49 | |
| | 48 | 145.8 | 146.3 | 146.7 | 147.1 | 147.5 | 147.9 | 148.3 | 148.7 | 149.0 | 149.4 | 149.8 | 150.2 | 150.5 | 150.9 | 151.3 | 48 | |
| | 47 | 145.6 | 146.0 | 146.5 | 146.9 | 147.3 | 147.7 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 150.5 | 150.8 | 151.2 | 47 | |
| | 46 | 145.4 | 145.8 | 146.3 | 146.7 | 147.1 | 147.6 | 148.0 | 148.4 | 148.8 | 149.2 | 149.6 | 150.0 | 150.4 | 150.8 | 151.1 | 46 | |
| 9-48 | 45 | 145.2 | 145.6 | 146.1 | 146.5 | 146.9 | 147.4 | 147.8 | 148.2 | 148.6 | 149.0 | 149.4 | 149.9 | 150.3 | 150.7 | 151.1 | 45 | 2-12 |
| | 44 | 144.9 | 145.4 | 145.8 | 146.3 | 146.7 | 147.2 | 147.6 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 150.2 | 150.6 | 151.0 | 44 | |
| | 43 | 144.7 | 145.1 | 145.6 | 146.1 | 146.5 | 147.0 | 147.4 | 147.9 | 148.3 | 148.8 | 149.2 | 149.6 | 150.0 | 150.5 | 150.9 | 43 | |
| | 42 | 144.4 | 144.9 | 145.4 | 145.8 | 146.3 | 146.8 | 147.3 | 147.7 | 148.2 | 148.6 | 149.0 | 149.5 | 149.9 | 150.3 | 150.8 | 42 | |
| | 41 | 144.1 | 144.6 | 145.1 | 145.6 | 146.1 | 146.6 | 147.0 | 147.5 | 148.0 | 148.4 | 148.9 | 149.3 | 149.8 | 150.2 | 150.7 | 41 | |
| | 49 | 145.1 | 145.5 | 145.9 | 146.3 | 146.7 | 147.1 | 147.5 | 147.9 | 148.3 | 148.6 | 149.0 | 149.4 | 149.8 | 150.2 | 150.5 | 49 | |
| | 48 | 144.9 | 145.3 | 145.7 | 146.1 | 146.6 | 147.0 | 147.4 | 147.8 | 148.2 | 148.5 | 148.9 | 149.3 | 149.7 | 150.1 | 150.5 | 48 | |
| | 47 | 144.7 | 145.1 | 145.5 | 146.0 | 146.4 | 146.8 | 147.2 | 147.6 | 148.0 | 148.4 | 148.8 | 149.2 | 149.6 | 150.0 | 150.4 | 47 | |
| | 46 | 144.5 | 144.9 | 145.3 | 145.8 | 146.2 | 146.7 | 147.1 | 147.5 | 147.9 | 148.3 | 148.7 | 149.1 | 149.5 | 149.9 | 150.3 | 46 | |
| 9-44 | 45 | 144.2 | 144.7 | 145.1 | 145.6 | 146.0 | 146.5 | 146.9 | 147.3 | 147.8 | 148.2 | 148.6 | 149.0 | 149.4 | 149.8 | 150.2 | 45 | 2-16 |
| | 44 | 144.0 | 144.4 | 144.9 | 145.4 | 145.8 | 146.3 | 146.7 | 147.2 | 147.6 | 148.0 | 148.5 | 148.9 | 149.3 | 149.7 | 150.2 | 44 | |
| | 43 | 143.7 | 144.2 | 144.7 | 145.2 | 145.6 | 146.1 | 146.6 | 147.0 | 147.5 | 147.9 | 148.3 | 148.8 | 149.2 | 149.6 | 150.1 | 43 | |
| | 42 | 143.4 | 143.9 | 144.4 | 144.9 | 145.4 | 145.9 | 146.4 | 146.8 | 147.3 | 147.7 | 148.2 | 148.6 | 149.1 | 149.5 | 150.0 | 42 | |
| | 41 | 143.2 | 143.7 | 144.2 | 144.7 | 145.2 | 145.7 | 146.1 | 146.6 | 147.1 | 147.6 | 148.0 | 148.5 | 148.9 | 149.4 | 149.8 | 41 | |
| | 49 | 144.2 | 144.6 | 145.0 | 145.4 | 145.8 | 146.2 | 146.6 | 147.0 | 147.4 | 147.8 | 148.2 | 148.6 | 148.9 | 149.3 | 149.7 | 49 | |
| | 48 | 144.0 | 144.4 | 144.8 | 145.2 | 145.7 | 146.1 | 146.5 | 146.9 | 147.3 | 147.7 | 148.1 | 148.5 | 148.9 | 149.3 | 149.7 | 48 | |
| | 47 | 143.7 | 144.2 | 144.6 | 145.1 | 145.5 | 145.9 | 146.3 | 146.8 | 147.2 | 147.6 | 148.0 | 148.4 | 148.8 | 149.2 | 149.6 | 47 | |
| | 46 | 143.5 | 144.0 | 144.4 | 144.9 | 145.3 | 145.8 | 146.2 | 146.6 | 147.0 | 147.5 | 147.9 | 148.3 | 148.7 | 149.1 | 149.5 | 46 | |
| 9-40 | 45 | 143.3 | 143.7 | 144.2 | 144.7 | 145.1 | 145.6 | 146.0 | 146.5 | 146.9 | 147.3 | 147.8 | 148.2 | 148.6 | 149.0 | 149.4 | 45 | 2-20 |
| | 44 | 143.0 | 143.5 | 144.0 | 144.5 | 144.9 | 145.4 | 145.8 | 146.3 | 146.7 | 147.2 | 147.6 | 148.1 | 148.5 | 148.9 | 149.4 | 44 | |
| | 43 | 142.8 | 143.3 | 143.8 | 144.2 | 144.7 | 145.2 | 145.7 | 146.1 | 146.6 | 147.0 | 147.5 | 147.9 | 148.4 | 148.8 | 149.3 | 43 | |
| | 42 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 145.0 | 145.5 | 146.0 | 146.4 | 146.9 | 147.3 | 147.8 | 148.2 | 148.7 | 149.1 | 42 | |
| | 41 | 142.2 | 142.7 | 143.3 | 143.8 | 144.3 | 144.8 | 145.3 | 145.8 | 146.2 | 146.7 | 147.2 | 147.6 | 148.1 | 148.6 | 149.0 | 41 | |
| | 49 | 143.2 | 143.7 | 144.1 | 144.5 | 144.9 | 145.3 | 145.7 | 146.1 | 146.5 | 146.9 | 147.3 | 147.7 | 148.1 | 148.5 | 148.9 | 49 | |
| | 48 | 143.0 | 143.5 | 143.9 | 144.3 | 144.8 | 145.2 | 145.6 | 146.0 | 146.4 | 146.8 | 147.2 | 147.6 | 148.0 | 148.4 | 148.8 | 48 | |
| | 47 | 142.8 | 143.3 | 143.7 | 144.2 | 144.6 | 145.0 | 145.5 | 145.9 | 146.3 | 146.7 | 147.1 | 147.5 | 148.0 | 148.4 | 148.8 | 47 | |
| | 46 | 142.6 | 143.1 | 143.5 | 144.0 | 144.4 | 144.9 | 145.3 | 145.7 | 146.2 | 146.6 | 147.0 | 147.4 | 147.9 | 148.3 | 148.7 | 46 | |
| 9-36 | 45 | 142.3 | 142.8 | 143.3 | 143.8 | 144.2 | 144.7 | 145.1 | 145.6 | 146.0 | 146.5 | 146.9 | 147.3 | 147.8 | 148.2 | 148.6 | 45 | 2-24 |
| | 44 | 142.1 | 142.6 | 143.1 | 143.6 | 144.0 | 144.5 | 145.0 | 145.4 | 145.9 | 146.3 | 146.8 | 147.2 | 147.7 | 148.1 | 148.5 | 44 | |
| | 43 | 141.8 | 142.4 | 142.8 | 143.3 | 143.8 | 144.3 | 144.8 | 145.3 | 145.7 | 146.2 | 146.6 | 147.1 | 147.5 | 148.0 | 148.4 | 43 | |
| | 42 | 141.6 | 142.1 | 142.6 | 143.1 | 143.6 | 144.1 | 144.6 | 145.1 | 145.6 | 146.0 | 146.5 | 147.0 | 147.4 | 147.9 | 148.3 | 42 | |
| | 41 | 141.3 | 141.8 | 142.3 | 142.9 | 143.4 | 143.9 | 144.4 | 144.9 | 145.4 | 145.9 | 146.3 | 146.8 | 147.3 | 147.8 | 148.2 | 41 | |
| | 49 | 142.3 | 142.7 | 143.2 | 143.6 | 144.0 | 144.4 | 144.8 | 145.3 | 145.7 | 146.1 | 146.5 | 146.9 | 147.3 | 147.7 | 148.1 | 49 | |
| | 48 | 142.1 | 142.5 | 143.0 | 143.4 | 143.9 | 144.3 | 144.7 | 145.1 | 145.6 | 146.0 | 146.4 | 146.8 | 147.2 | 147.6 | 148.0 | 48 | |
| | 47 | 141.9 | 142.3 | 142.8 | 143.3 | 143.7 | 144.1 | 144.6 | 145.0 | 145.5 | 145.9 | 146.3 | 146.7 | 147.1 | 147.6 | 148.0 | 47 | |
| | 46 | 141.7 | 142.1 | 142.6 | 143.1 | 143.5 | 144.0 | 144.4 | 144.9 | 145.3 | 145.7 | 146.2 | 146.6 | 147.0 | 147.5 | 147.9 | 46 | |
| 9-32 | 45 | 141.4 | 141.9 | 142.4 | 142.9 | 143.3 | 143.8 | 144.3 | 144.7 | 145.2 | 145.6 | 146.1 | 146.5 | 146.9 | 147.4 | 147.8 | 45 | 2-28 |
| | 44 | 141.2 | 141.7 | 142.2 | 142.7 | 143.1 | 143.6 | 144.1 | 144.6 | 145.0 | 145.5 | 145.9 | 146.4 | 146.8 | 147.3 | 147.7 | 44 | |
| | 43 | 140.9 | 141.4 | 141.9 | 142.4 | 142.9 | 143.4 | 143.9 | 144.4 | 144.9 | 145.3 | 145.8 | 146.3 | 146.7 | 147.2 | 147.6 | 43 | |
| | 42 | 140.6 | 141.2 | 141.7 | 142.2 | 142.7 | 143.2 | 143.7 | 144.2 | 144.7 | 145.2 | 145.7 | 146.1 | 146.6 | 147.1 | 147.5 | 42 | |
| | 41 | 140.3 | 140.9 | 141.4 | 142.0 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 145.0 | 145.5 | 146.0 | 146.5 | 147.0 | 147.4 | 41 | |
| | 49 | 141.4 | 141.8 | 142.2 | 142.7 | 143.1 | 143.6 | 144.0 | 144.4 | 144.8 | 145.2 | 145.6 | 146.1 | 146.5 | 146.9 | 147.3 | 49 | |
| | 48 | 141.2 | 141.6 | 142.1 | 142.5 | 143.0 | 143.4 | 143.8 | 144.3 | 144.7 | 145.1 | 145.6 | 146.0 | 146.4 | 146.8 | 147.2 | 48 | |
| | 47 | 141.0 | 141.4 | 141.9 | 142.4 | 142.8 | 143.3 | 143.7 | 144.2 | 144.6 | 145.0 | 145.5 | 145.9 | 146.3 | 146.7 | 147.2 | 47 | |
| | 46 | 140.7 | 141.2 | 141.7 | 142.2 | 142.6 | 143.1 | 143.6 | 144.0 | 144.5 | 144.9 | 145.3 | 145.8 | 146.2 | 146.7 | 147.1 | 46 | |
| 9-28 | 45 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 142.9 | 143.4 | 143.9 | 144.3 | 144.8 | 145.2 | 145.7 | 146.1 | 146.6 | 147.0 | 45 | 2-32 |
| | 44 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.7 | 143.2 | 143.7 | 144.2 | 144.6 | 145.1 | 145.6 | 146.0 | 146.5 | 146.9 | 44 | |
| | 43 | 140.0 | 140.5 | 141.0 | 141.6 | 142.1 | 142.6 | 143.1 | 143.5 | 144.0 | 144.5 | 145.0 | 145.5 | 145.9 | 146.4 | 146.9 | 43 | |
| | 42 | 139.7 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.9 | 143.4 | 143.9 | 144.3 | 144.8 | 145.3 | 145.8 | 146.3 | 146.8 | 42 | |
| | 41 | 139.4 | 140.0 | 140.5 | 141.1 | 141.6 | 142.1 | 142.7 | 143.2 | 143.7 | 144.2 | 144.7 | 145.2 | 145.7 | 146.2 | 146.6 | 41 | |
| | 49 | 140.5 | 140.9 | 141.3 | 141.8 | 142.2 | 142.7 | 143.1 | 143.5 | 144.0 | 144.4 | 144.8 | 145.2 | 145.7 | 146.1 | 146.5 | 49 | |
| | 48 | 140.3 | 140.7 | 141.2 | 141.6 | 142.1 | 142.5 | 143.0 | 143.4 | 143.9 | 144.3 | 144.7 | 145.2 | 145.6 | 146.0 | 146.4 | 48 | |
| | 47 | 140.0 | 140.5 | 141.0 | 141.5 | 141.9 | 142.4 | 142.8 | 143.3 | 143.8 | 144.2 | 144.6 | 145.1 | 145.5 | 145.9 | 146.4 | 47 | |
| | 46 | 139.8 | 140.3 | 140.8 | 141.3 | 141.8 | 142.2 | 142.7 | 143.2 | 143.6 | 144.1 | 144.5 | 145.0 | 145.4 | 145.9 | 146.3 | 46 | |
| 9-24 | 45 | 139.6 | 140.1 | 140.6 | 141.1 | 141.6 | 142.1 | 142.5 | 143.0 | 143.5 | 143.9 | 144.4 | 144.9 | 145.3 | 145.8 | 146.2 | 45 | 2-36 |
| | 44 | 139.3 | 139.9 | 140.4 | 140.9 | 141.4 | 141.9 | 142.4 | 142.8 | 143.3 | 143.8 | 144.3 | 144.7 | 145.2 | 145.7 | 146.2 | 44 | |
| | 43 | 139.1 | 139.6 | 140.1 | 140.7 | 141.2 | 141.7 | 142.2 | 142.7 | 143.2 | 143.7 | 144.2 | 144.6 | 145.1 | 145.6 | 146.1 | 43 | |
| | 42 | 138.8 | 139.4 | 139.9 | 140.4 | 141.0 | 141.5 | 142.0 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 145.0 | 145.5 | 146.0 | 42 | |
| | 41 | 138.5 | 139.1 | 139.6 | 140.2 | 140.7 | 141.3 | 141.8 | 142.3 | 142.8 | 143.4 | 143.9 | 144.4 | 144.9 | 145.4 | 145.9 | 41 | |
| | 49 | 139.6 | 140.0 | 140.5 | 140.9 | 141.4 | 141.8 | 142.3 | 142.7 | 143.1 | 143.6 | 144.0 | 144.4 | 144.8 | 145.3 | 145.7 | 49 | |
| | 48 | 139.4 | 139.8 | 140.3 | 140.8 | 141.2 | 141.7 | 142.1 | 142.6 | 143.0 | 143.5 | 143.9 | 144.3 | 144.8 | 145.2 | 145.7 | 48 | |
| | 47 | 139.1 | 139.6 | 140.1 | 140.6 | 141.1 | 141.5 | 142.0 | 142.4 | 142.9 | 143.3 | 143.8 | 144.3 | 144.7 | 145.1 | 145.6 | 47 | |
| | 46 | 138.9 | 139.4 | 139.9 | 140.4 | 140.9 | 141.4 | 141.8 | 142.3 | 142.8 | 143.2 | 143.7 | 144.2 | 144.6 | 145.1 | 145.5 | 46 | |
| 9-20 | 45 | 138.7 | 139.2 | 139.7 | 140.2 | 140.7 | 141.2 | 141.7 | 142.2 | 142.6 | 143.1 | 143.6 | 144.1 | 144.5 | 145.0 | 145.5 | 45 | 2-40 |
| | 44 | 138.4 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 143.0 | 143.5 | 143.9 | 144.4 | 144.9 | 145.4 | 44 | |
| | 43 | 138.2 | 138.7 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.9 | 143.3 | 143.8 | 144.3 | 144.8 | 145.3 | 43 | |
| | 42 | 137.9 | 138.5 | 139.0 | 139.6 | 140.1 | 140.6 | 141.2 | 141.7 | 142.2 | 142.7 | 143.2 | 143.7 | 144.2 | 144.7 | 145.2 | 42 | |
| | 41 | 137.6 | 138.2 | 138.8 | 139.3 | 139.9 | 140.4 | 141.0 | 141.5 | 142.0 | 142.5 | 143.1 | 143.6 | 144.1 | 144.6 | 145.1 | 41 | |
| | 49 | 138.7 | 139.1 | 139.6 | 140.0 | 140.5 | 140.9 | 141.4 | 141.8 | 142.3 | 142.7 | 143.2 | 143.6 | 144.0 | 144.5 | 144.9 | 49 | |
| | 48 | 138.5 | 138.9 | 139.4 | 139.9 | 140.3 | 140.8 | 141.3 | 141.7 | 142.2 | 142.6 | 143.1 | 143.5 | 144.0 | 144.4 | 144.9 | 48 | |
| | 47 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 140.7 | 141.1 | 141.6 | 142.1 | 142.5 | 143.0 | 143.4 | 143.9 | 144.3 | 144.8 | 47 | |
| | 46 | 138.0 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 141.9 | 142.4 | 142.9 | 143.3 | 143.8 | 144.3 | 144.7 | 46 | |
| 9-16 | 45 | 137.8 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.8 | 143.2 | 143.7 | 144.2 | 144.7 | 45 | 2-44 |
| | 44 | 137.5 | 138.1 | 138.6 | 139.1 | 139.6 | 140.2 | 140.7 | 141.2 | 141.7 | 142.2 | 142.7 | 143.1 | 143.6 | 144.1 | 144.6 | 44 | |
| | 43 | 137.3 | 137.8 | 138.4 | 138.9 | 139.4 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 43 | |
| | 42 | 137.0 | 137.6 | 138.2 | 138.7 | 139.2 | 139.8 | 140.3 | 140.8 | 141.4 | 141.9 | 142.4 | 142.9 | 143.4 | 143.9 | 144.4 | 42 | |
| | 41 | 136.7 | 137.3 | 137.9 | 138.5 | 139.0 | 139.6 | 140.1 | 140.6 | 141.2 | 141.7 | 142.2 | 142.8 | 143.3 | 143.8 | 144.3 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A.M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 131.0 | 131.5 | 132.1 | 132.6 | 133.2 | 133.7 | 134.2 | 134.7 | 135.3 | 135.8 | 136.3 | 136.7 | 137.2 | 137.7 | 138.2 | 49 | |
| | 48 | 130.5 | 131.1 | 131.7 | 132.2 | 132.8 | 133.4 | 133.9 | 134.4 | 135.0 | 135.5 | 136.0 | 136.5 | 137.0 | 137.5 | 138.0 | 48 | |
| | 47 | 130.1 | 130.7 | 131.3 | 131.9 | 132.4 | 133.0 | 133.6 | 134.1 | 134.7 | 135.2 | 135.7 | 136.2 | 136.7 | 137.2 | 137.7 | 47 | |
| | 46 | 129.6 | 130.2 | 130.8 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 134.3 | 134.9 | 135.4 | 135.9 | 136.5 | 137.0 | 137.5 | 46 | |
| 9-16 | 45 | 129.1 | 129.8 | 130.4 | 131.0 | 131.6 | 132.2 | 132.8 | 133.4 | 134.0 | 134.6 | 135.1 | 135.7 | 136.2 | 136.7 | 137.3 | 45 | 2-44 |
| | 44 | 128.6 | 129.3 | 129.9 | 130.6 | 131.2 | 131.8 | 132.5 | 133.0 | 133.6 | 134.2 | 134.8 | 135.4 | 135.9 | 136.5 | 137.0 | 44 | |
| | 43 | 128.1 | 128.8 | 129.5 | 130.1 | 130.8 | 131.4 | 132.0 | 132.7 | 133.3 | 133.9 | 134.5 | 135.0 | 135.6 | 136.2 | 136.7 | 43 | |
| | 42 | 127.6 | 128.3 | 129.0 | 129.7 | 130.3 | 131.0 | 131.6 | 132.3 | 132.9 | 133.5 | 134.1 | 134.7 | 135.3 | 135.9 | 136.5 | 42 | |
| | 41 | 127.0 | 127.8 | 128.5 | 129.2 | 129.9 | 130.6 | 131.2 | 131.9 | 132.5 | 133.1 | 133.8 | 134.4 | 135.0 | 135.6 | 136.2 | 41 | |
| | 49 | 130.0 | 130.5 | 131.1 | 131.7 | 132.2 | 132.7 | 133.3 | 133.8 | 134.3 | 134.8 | 135.3 | 135.8 | 136.3 | 136.8 | 137.3 | 49 | |
| | 48 | 129.5 | 130.1 | 130.7 | 131.3 | 131.8 | 132.4 | 132.9 | 133.5 | 134.0 | 134.5 | 135.1 | 135.6 | 136.1 | 136.6 | 137.1 | 48 | |
| | 47 | 129.1 | 129.7 | 130.3 | 130.9 | 131.5 | 132.0 | 132.6 | 133.2 | 133.7 | 134.2 | 134.8 | 135.3 | 135.8 | 136.3 | 136.8 | 47 | |
| | 46 | 128.6 | 129.3 | 129.9 | 130.5 | 131.1 | 131.7 | 132.3 | 132.8 | 133.4 | 133.9 | 134.5 | 135.0 | 135.6 | 136.1 | 136.6 | 46 | |
| 9-12 | 45 | 128.2 | 128.8 | 129.4 | 130.1 | 130.7 | 131.3 | 131.9 | 132.5 | 133.1 | 133.6 | 134.2 | 134.7 | 135.3 | 135.8 | 136.4 | 45 | 2-48 |
| | 44 | 127.7 | 128.3 | 129.0 | 129.6 | 130.3 | 130.9 | 131.5 | 132.1 | 132.7 | 133.3 | 133.9 | 134.4 | 135.0 | 135.6 | 136.1 | 44 | |
| | 43 | 127.1 | 127.8 | 128.5 | 129.2 | 129.8 | 130.5 | 131.1 | 131.7 | 132.3 | 132.9 | 133.5 | 134.1 | 134.7 | 135.3 | 135.9 | 43 | |
| | 42 | 126.6 | 127.3 | 128.0 | 128.7 | 129.4 | 130.0 | 130.7 | 131.3 | 132.0 | 132.6 | 133.2 | 133.8 | 134.4 | 135.0 | 135.6 | 42 | |
| | 41 | 126.1 | 126.8 | 127.5 | 128.2 | 128.9 | 129.6 | 130.3 | 130.9 | 131.6 | 132.2 | 132.8 | 133.5 | 134.1 | 134.7 | 135.3 | 41 | |
| | 49 | 129.0 | 129.6 | 130.1 | 130.7 | 131.2 | 131.8 | 132.3 | 132.8 | 133.4 | 133.9 | 134.4 | 134.9 | 135.4 | 135.9 | 136.4 | 49 | |
| | 48 | 128.6 | 129.2 | 129.7 | 130.3 | 130.9 | 131.4 | 132.0 | 132.6 | 133.1 | 133.6 | 134.1 | 134.7 | 135.2 | 135.7 | 136.2 | 48 | |
| | 47 | 128.1 | 128.7 | 129.3 | 129.9 | 130.5 | 131.1 | 131.7 | 132.2 | 132.8 | 133.3 | 133.9 | 134.4 | 134.9 | 135.4 | 136.0 | 47 | |
| | 46 | 127.7 | 128.3 | 128.9 | 129.5 | 130.1 | 130.7 | 131.3 | 131.9 | 132.5 | 133.0 | 133.6 | 134.1 | 134.7 | 135.2 | 135.7 | 46 | |
| 9-08 | 45 | 127.2 | 127.8 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | 131.5 | 132.1 | 132.7 | 133.3 | 133.8 | 134.4 | 134.9 | 135.5 | 45 | 2-52 |
| | 44 | 126.7 | 127.4 | 128.0 | 128.7 | 129.3 | 129.9 | 130.6 | 131.2 | 131.8 | 132.4 | 133.0 | 133.5 | 134.1 | 134.7 | 135.2 | 44 | |
| | 43 | 126.2 | 126.9 | 127.6 | 128.2 | 128.9 | 129.5 | 130.2 | 130.8 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 134.4 | 135.0 | 43 | |
| | 42 | 125.7 | 126.4 | 127.1 | 127.8 | 128.5 | 129.1 | 129.8 | 130.4 | 131.1 | 131.7 | 132.3 | 132.9 | 133.5 | 134.1 | 134.7 | 42 | |
| | 41 | 125.1 | 125.9 | 126.6 | 127.3 | 128.0 | 128.7 | 129.3 | 130.0 | 130.7 | 131.3 | 131.9 | 132.6 | 133.2 | 133.8 | 134.4 | 41 | |
| | 49 | 128.0 | 128.6 | 129.2 | 129.7 | 130.3 | 130.8 | 131.4 | 131.9 | 132.4 | 133.0 | 133.5 | 134.0 | 134.5 | 135.0 | 135.5 | 49 | |
| | 48 | 127.6 | 128.2 | 128.8 | 129.4 | 129.9 | 130.5 | 131.1 | 131.6 | 132.2 | 132.7 | 133.2 | 133.7 | 134.3 | 134.8 | 135.3 | 48 | |
| | 47 | 127.1 | 127.8 | 128.4 | 129.0 | 129.6 | 130.1 | 130.7 | 131.3 | 131.9 | 132.4 | 133.0 | 133.5 | 134.0 | 134.5 | 135.1 | 47 | |
| | 46 | 126.7 | 127.3 | 128.0 | 128.6 | 129.2 | 129.8 | 130.4 | 131.0 | 131.5 | 132.1 | 132.7 | 133.2 | 133.8 | 134.3 | 134.8 | 46 | |
| 9-04 | 45 | 126.2 | 126.9 | 127.5 | 128.2 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.4 | 132.9 | 133.5 | 134.1 | 134.6 | 45 | 2-56 |
| | 44 | 125.7 | 126.4 | 127.1 | 127.7 | 128.4 | 129.0 | 129.6 | 130.3 | 130.9 | 131.5 | 132.1 | 132.6 | 133.2 | 133.8 | 134.4 | 44 | |
| | 43 | 125.2 | 125.9 | 126.6 | 127.3 | 128.0 | 128.6 | 129.3 | 129.9 | 130.5 | 131.1 | 131.7 | 132.3 | 132.9 | 133.5 | 134.1 | 43 | |
| | 42 | 124.7 | 125.4 | 126.1 | 126.8 | 127.5 | 128.2 | 128.9 | 129.5 | 130.2 | 130.8 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 42 | |
| | 41 | 124.2 | 124.9 | 125.7 | 126.4 | 127.1 | 127.8 | 128.4 | 129.1 | 129.8 | 130.4 | 131.0 | 131.7 | 132.3 | 132.9 | 133.5 | 41 | |
| | 49 | 127.1 | 127.6 | 128.2 | 128.8 | 129.3 | 129.9 | 130.4 | 131.0 | 131.5 | 132.0 | 132.6 | 133.1 | 133.6 | 134.1 | 134.6 | 49 | |
| | 48 | 126.6 | 127.2 | 127.8 | 128.4 | 129.0 | 129.6 | 130.1 | 130.7 | 131.2 | 131.8 | 132.3 | 132.8 | 133.4 | 133.9 | 134.4 | 48 | |
| | 47 | 126.2 | 126.8 | 127.4 | 128.0 | 128.6 | 129.2 | 129.8 | 130.4 | 130.9 | 131.5 | 132.0 | 132.6 | 133.1 | 133.7 | 134.2 | 47 | |
| | 46 | 125.7 | 126.4 | 127.0 | 127.6 | 128.2 | 128.9 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.3 | 132.9 | 133.4 | 134.0 | 46 | |
| 9-00 | 45 | 125.3 | 125.9 | 126.6 | 127.2 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | 131.5 | 132.0 | 132.6 | 133.2 | 133.7 | 45 | 3-00 |
| | 44 | 124.8 | 125.5 | 126.1 | 126.8 | 127.5 | 128.1 | 128.7 | 129.3 | 130.0 | 130.6 | 131.2 | 131.8 | 132.3 | 132.9 | 133.5 | 44 | |
| | 43 | 124.3 | 125.0 | 125.7 | 126.4 | 127.0 | 127.7 | 128.3 | 129.0 | 129.6 | 130.2 | 130.8 | 131.5 | 132.1 | 132.6 | 133.2 | 43 | |
| | 42 | 123.8 | 124.5 | 125.2 | 125.9 | 126.6 | 127.3 | 127.9 | 128.6 | 129.3 | 129.9 | 130.5 | 131.1 | 131.8 | 132.4 | 133.0 | 42 | |
| | 41 | 123.3 | 124.0 | 124.7 | 125.5 | 126.2 | 126.9 | 127.5 | 128.2 | 128.9 | 129.5 | 130.2 | 130.8 | 131.5 | 132.1 | 132.7 | 41 | |
| | 49 | 126.1 | 126.7 | 127.3 | 127.8 | 128.4 | 129.0 | 129.5 | 130.1 | 130.6 | 131.1 | 131.7 | 132.2 | 132.7 | 133.2 | 133.7 | 49 | |
| | 48 | 125.7 | 126.3 | 126.9 | 127.5 | 128.1 | 128.6 | 129.2 | 129.8 | 130.3 | 130.9 | 131.4 | 131.9 | 132.5 | 133.0 | 133.5 | 48 | |
| | 47 | 125.2 | 125.9 | 126.5 | 127.1 | 127.7 | 128.3 | 128.9 | 129.5 | 130.0 | 130.6 | 131.2 | 131.7 | 132.2 | 132.8 | 133.3 | 47 | |
| | 46 | 124.8 | 125.5 | 126.1 | 126.7 | 127.3 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | 131.4 | 132.0 | 132.6 | 133.1 | 46 | |
| 8-56 | 45 | 124.3 | 125.0 | 125.7 | 126.3 | 126.9 | 127.6 | 128.2 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 131.7 | 132.3 | 132.9 | 45 | 3-04 |
| | 44 | 123.9 | 124.5 | 125.2 | 125.9 | 126.5 | 127.2 | 127.8 | 128.4 | 129.1 | 129.7 | 130.3 | 130.9 | 131.5 | 132.1 | 132.6 | 44 | |
| | 43 | 123.4 | 124.1 | 124.8 | 125.5 | 126.1 | 126.8 | 127.4 | 128.1 | 128.7 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.4 | 43 | |
| | 42 | 122.9 | 123.6 | 124.3 | 125.0 | 125.7 | 126.4 | 127.0 | 127.7 | 128.4 | 129.0 | 129.6 | 130.3 | 130.9 | 131.5 | 132.1 | 42 | |
| | 41 | 122.4 | 123.1 | 123.8 | 124.6 | 125.3 | 126.0 | 126.6 | 127.3 | 128.0 | 128.7 | 129.3 | 130.0 | 130.6 | 131.2 | 131.8 | 41 | |
| | 49 | 125.1 | 125.7 | 126.3 | 126.9 | 127.5 | 128.0 | 128.6 | 129.1 | 129.7 | 130.2 | 130.8 | 131.3 | 131.8 | 132.3 | 132.9 | 49 | |
| | 48 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.7 | 128.3 | 128.9 | 129.4 | 130.0 | 130.5 | 131.1 | 131.6 | 132.1 | 132.7 | 48 | |
| | 47 | 124.3 | 124.9 | 125.6 | 126.2 | 126.8 | 127.4 | 128.0 | 128.5 | 129.1 | 129.7 | 130.3 | 130.8 | 131.4 | 131.9 | 132.5 | 47 | |
| | 46 | 123.9 | 124.5 | 125.2 | 125.8 | 126.4 | 127.0 | 127.6 | 128.2 | 128.8 | 129.4 | 130.0 | 130.6 | 131.1 | 131.7 | 132.2 | 46 | |
| 8-52 | 45 | 123.4 | 124.1 | 124.7 | 125.4 | 126.0 | 126.7 | 127.3 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | 131.4 | 132.0 | 45 | 3-08 |
| | 44 | 122.9 | 123.6 | 124.3 | 125.0 | 125.6 | 126.3 | 126.9 | 127.5 | 128.2 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 44 | |
| | 43 | 122.5 | 123.2 | 123.9 | 124.6 | 125.2 | 125.9 | 126.6 | 127.2 | 127.8 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | 131.5 | 43 | |
| | 42 | 122.0 | 122.7 | 123.4 | 124.1 | 124.8 | 125.5 | 126.2 | 126.8 | 127.5 | 128.1 | 128.8 | 129.4 | 130.0 | 130.7 | 131.3 | 42 | |
| | 41 | 121.5 | 122.2 | 122.9 | 123.7 | 124.4 | 125.1 | 125.8 | 126.5 | 127.1 | 127.8 | 128.4 | 129.1 | 129.7 | 130.4 | 131.0 | 41 | |
| | 49 | 124.2 | 124.8 | 125.4 | 126.0 | 126.6 | 127.1 | 127.7 | 128.2 | 128.8 | 129.3 | 129.9 | 130.4 | 130.9 | 131.5 | 132.0 | 49 | |
| | 48 | 123.8 | 124.4 | 125.0 | 125.6 | 126.2 | 126.8 | 127.4 | 128.0 | 128.5 | 129.1 | 129.6 | 130.2 | 130.7 | 131.3 | 131.8 | 48 | |
| | 47 | 123.4 | 124.0 | 124.6 | 125.3 | 125.9 | 126.5 | 127.1 | 127.6 | 128.2 | 128.8 | 129.4 | 129.9 | 130.5 | 131.0 | 131.6 | 47 | |
| | 46 | 122.9 | 123.6 | 124.2 | 124.9 | 125.5 | 126.1 | 126.7 | 127.3 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 130.8 | 131.4 | 46 | |
| 8-48 | 45 | 122.5 | 123.2 | 123.8 | 124.5 | 125.1 | 125.8 | 126.4 | 127.0 | 127.6 | 128.2 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 45 | 3-12 |
| | 44 | 122.0 | 122.7 | 123.4 | 124.1 | 124.7 | 125.4 | 126.0 | 126.7 | 127.3 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | 44 | |
| | 43 | 121.6 | 122.3 | 123.0 | 123.7 | 124.3 | 125.0 | 125.7 | 126.3 | 127.0 | 127.6 | 128.2 | 128.9 | 129.5 | 130.1 | 130.7 | 43 | |
| | 42 | 121.1 | 121.8 | 122.5 | 123.2 | 123.9 | 124.6 | 125.3 | 126.0 | 126.6 | 127.3 | 127.9 | 128.6 | 129.2 | 129.8 | 130.4 | 42 | |
| | 41 | 120.6 | 121.3 | 122.1 | 122.8 | 123.5 | 124.2 | 124.9 | 125.6 | 126.3 | 126.9 | 127.6 | 128.3 | 128.9 | 129.5 | 130.2 | 41 | |
| | 49 | 123.3 | 123.9 | 124.5 | 125.1 | 125.6 | 126.2 | 126.8 | 127.3 | 127.9 | 128.4 | 129.0 | 129.5 | 130.1 | 130.6 | 131.1 | 49 | |
| | 48 | 122.9 | 123.5 | 124.1 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.6 | 128.2 | 128.8 | 129.3 | 129.9 | 130.4 | 130.9 | 48 | |
| | 47 | 122.5 | 123.1 | 123.7 | 124.4 | 125.0 | 125.6 | 126.2 | 126.8 | 127.3 | 127.9 | 128.5 | 129.1 | 129.6 | 130.2 | 130.7 | 47 | |
| | 46 | 122.0 | 122.7 | 123.3 | 124.0 | 124.6 | 125.2 | 125.8 | 126.4 | 127.0 | 127.6 | 128.2 | 128.8 | 129.4 | 130.0 | 130.5 | 46 | |
| 8-44 | 45 | 121.6 | 122.3 | 122.9 | 123.6 | 124.2 | 124.9 | 125.5 | 126.1 | 126.7 | 127.4 | 128.0 | 128.6 | 129.2 | 129.7 | 130.3 | 45 | 3-16 |
| | 44 | 121.1 | 121.8 | 122.5 | 123.2 | 123.9 | 124.5 | 125.2 | 125.8 | 126.4 | 127.1 | 127.7 | 128.3 | 128.9 | 129.5 | 130.1 | 44 | |
| | 43 | 120.7 | 121.4 | 122.1 | 122.8 | 123.5 | 124.1 | 124.8 | 125.5 | 126.1 | 126.7 | 127.4 | 128.0 | 128.6 | 129.2 | 129.8 | 43 | |
| | 42 | 120.2 | 120.9 | 121.6 | 122.4 | 123.1 | 123.7 | 124.4 | 125.1 | 125.8 | 126.4 | 127.1 | 127.7 | 128.4 | 129.0 | 129.6 | 42 | |
| | 41 | 119.7 | 120.5 | 121.2 | 121.9 | 122.6 | 123.3 | 124.0 | 124.7 | 125.4 | 126.1 | 126.8 | 127.4 | 128.1 | 128.7 | 129.3 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

9 hrs. 16 m. to 8 hrs. 44 m. 2 hrs. 44 m. to 3 hrs. 16 m.

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 138.7 | 139.1 | 139.6 | 140.0 | 140.5 | 140.9 | 141.4 | 141.8 | 142.3 | 142.7 | 143.2 | 143.6 | 144.0 | 144.5 | 144.9 | 49 | |
| | 48 | 138.5 | 138.9 | 139.4 | 139.9 | 140.3 | 140.8 | 141.3 | 141.7 | 142.2 | 142.6 | 143.1 | 143.5 | 144.0 | 144.4 | 144.9 | 48 | |
| | 47 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 140.7 | 141.1 | 141.6 | 142.1 | 142.5 | 143.0 | 143.4 | 143.9 | 144.3 | 144.8 | 47 | |
| | 46 | 138.0 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 141.9 | 142.4 | 142.9 | 143.3 | 143.8 | 144.3 | 144.7 | 46 | |
| 9-16 | 45 | 137.8 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.8 | 143.2 | 143.7 | 144.2 | 144.7 | 45 | 2-44 |
| | 44 | 137.5 | 138.1 | 138.6 | 139.1 | 139.6 | 140.2 | 140.7 | 141.2 | 141.7 | 142.2 | 142.7 | 143.1 | 143.6 | 144.1 | 144.6 | 44 | |
| | 43 | 137.3 | 137.8 | 138.4 | 138.9 | 139.4 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 143.0 | 143.5 | 144.0 | 144.5 | 43 | |
| | 42 | 137.0 | 137.6 | 138.2 | 138.7 | 139.2 | 139.8 | 140.3 | 140.8 | 141.4 | 141.9 | 142.4 | 142.9 | 143.4 | 143.9 | 144.4 | 42 | |
| | 41 | 136.7 | 137.3 | 137.9 | 138.5 | 139.0 | 139.6 | 140.1 | 140.6 | 141.2 | 141.7 | 142.2 | 142.8 | 143.3 | 143.8 | 144.3 | 41 | |
| | 49 | 137.8 | 138.2 | 138.7 | 139.2 | 139.6 | 140.1 | 140.5 | 141.0 | 141.4 | 141.9 | 142.3 | 142.8 | 143.2 | 143.7 | 144.1 | 49 | |
| | 48 | 137.6 | 138.0 | 138.5 | 139.0 | 139.5 | 140.0 | 140.4 | 140.9 | 141.3 | 141.8 | 142.3 | 142.7 | 143.2 | 143.6 | 144.1 | 48 | |
| | 47 | 137.4 | 137.9 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.8 | 141.2 | 141.7 | 142.2 | 142.6 | 143.1 | 143.6 | 144.0 | 47 | |
| | 46 | 137.1 | 137.7 | 138.2 | 138.7 | 139.2 | 139.7 | 140.1 | 140.6 | 141.1 | 141.6 | 142.1 | 142.5 | 143.0 | 143.5 | 144.0 | 46 | |
| 9-12 | 45 | 136.9 | 137.4 | 138.0 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 142.0 | 142.4 | 142.9 | 143.4 | 143.9 | 45 | 2-48 |
| | 44 | 136.7 | 137.2 | 137.7 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.8 | 142.3 | 142.8 | 143.3 | 143.8 | 44 | |
| | 43 | 136.4 | 137.0 | 137.5 | 138.1 | 138.6 | 139.1 | 139.7 | 140.2 | 140.7 | 141.2 | 141.7 | 142.2 | 142.7 | 143.2 | 143.7 | 43 | |
| | 42 | 136.1 | 136.7 | 137.3 | 137.8 | 138.4 | 138.9 | 139.5 | 140.0 | 140.5 | 141.1 | 141.6 | 142.1 | 142.6 | 143.1 | 143.6 | 42 | |
| | 41 | 135.9 | 136.4 | 137.0 | 137.6 | 138.2 | 138.7 | 139.3 | 139.8 | 140.4 | 140.9 | 141.4 | 142.0 | 142.5 | 143.0 | 143.5 | 41 | |
| | 49 | 136.9 | 137.3 | 137.8 | 138.3 | 138.8 | 139.2 | 139.7 | 140.2 | 140.6 | 141.1 | 141.5 | 142.0 | 142.4 | 142.9 | 143.3 | 49 | |
| | 48 | 136.7 | 137.2 | 137.7 | 138.1 | 138.6 | 139.1 | 139.6 | 140.1 | 140.5 | 141.0 | 141.4 | 141.9 | 142.4 | 142.8 | 143.3 | 48 | |
| | 47 | 136.5 | 137.0 | 137.5 | 138.0 | 138.5 | 139.0 | 139.4 | 139.9 | 140.4 | 140.9 | 141.4 | 141.8 | 142.3 | 142.8 | 143.2 | 47 | |
| | 46 | 136.3 | 136.8 | 137.3 | 137.8 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.7 | 142.2 | 142.7 | 143.2 | 46 | |
| 9-08 | 45 | 136.0 | 136.6 | 137.1 | 137.6 | 138.1 | 138.6 | 139.2 | 139.7 | 140.2 | 140.7 | 141.2 | 141.7 | 142.1 | 142.6 | 143.1 | 45 | 2-52 |
| | 44 | 135.8 | 136.3 | 136.9 | 137.4 | 137.9 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 142.1 | 142.6 | 143.1 | 44 | |
| | 43 | 135.5 | 136.1 | 136.6 | 137.2 | 137.7 | 138.3 | 138.8 | 139.4 | 139.9 | 140.4 | 140.9 | 141.4 | 142.0 | 142.5 | 143.0 | 43 | |
| | 42 | 135.3 | 135.9 | 136.4 | 137.0 | 137.5 | 138.1 | 138.6 | 139.2 | 139.7 | 140.3 | 140.8 | 141.3 | 141.8 | 142.4 | 142.9 | 42 | |
| | 41 | 135.0 | 135.6 | 136.2 | 136.8 | 137.3 | 137.9 | 138.5 | 139.0 | 139.6 | 140.1 | 140.6 | 141.2 | 141.7 | 142.3 | 142.8 | 41 | |
| | 49 | 136.0 | 136.5 | 136.9 | 137.4 | 137.9 | 138.4 | 138.8 | 139.3 | 139.8 | 140.2 | 140.7 | 141.2 | 141.6 | 142.1 | 142.5 | 49 | |
| | 48 | 135.8 | 136.3 | 136.8 | 137.3 | 137.8 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 140.6 | 141.1 | 141.6 | 142.0 | 142.5 | 48 | |
| | 47 | 135.6 | 136.1 | 136.6 | 137.1 | 137.6 | 138.1 | 138.6 | 139.1 | 139.6 | 140.1 | 140.5 | 141.0 | 141.5 | 142.0 | 142.5 | 47 | |
| | 46 | 135.4 | 135.9 | 136.4 | 136.9 | 137.5 | 138.0 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 140.9 | 141.4 | 141.9 | 142.4 | 46 | |
| 9-04 | 45 | 135.2 | 135.7 | 136.2 | 136.8 | 137.3 | 137.8 | 138.3 | 138.8 | 139.4 | 139.8 | 140.4 | 140.9 | 141.4 | 141.9 | 142.4 | 45 | 2-56 |
| | 44 | 134.9 | 135.5 | 136.0 | 136.6 | 137.1 | 137.6 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 140.8 | 141.3 | 141.8 | 142.3 | 44 | |
| | 43 | 134.7 | 135.2 | 135.8 | 136.4 | 136.9 | 137.5 | 138.0 | 138.5 | 139.1 | 139.6 | 140.1 | 140.7 | 141.2 | 141.7 | 142.2 | 43 | |
| | 42 | 134.4 | 135.0 | 135.6 | 136.1 | 136.7 | 137.3 | 137.8 | 138.4 | 138.9 | 139.5 | 140.0 | 140.5 | 141.1 | 141.6 | 142.1 | 42 | |
| | 41 | 134.2 | 134.7 | 135.3 | 135.9 | 136.5 | 137.1 | 137.6 | 138.2 | 138.8 | 139.3 | 139.9 | 140.4 | 141.0 | 141.5 | 142.0 | 41 | |
| | 49 | 135.1 | 135.6 | 136.1 | 136.6 | 137.1 | 137.5 | 138.0 | 138.5 | 139.0 | 139.4 | 139.9 | 140.4 | 140.8 | 141.3 | 141.8 | 49 | |
| | 48 | 134.9 | 135.4 | 135.9 | 136.4 | 136.9 | 137.4 | 137.9 | 138.4 | 138.9 | 139.3 | 139.8 | 140.3 | 140.8 | 141.3 | 141.7 | 48 | |
| | 47 | 134.7 | 135.2 | 135.8 | 136.3 | 136.8 | 137.3 | 137.8 | 138.3 | 138.8 | 139.3 | 139.8 | 140.2 | 140.7 | 141.2 | 141.7 | 47 | |
| | 46 | 134.5 | 135.0 | 135.6 | 136.1 | 136.6 | 137.1 | 137.6 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 140.7 | 141.2 | 141.7 | 46 | |
| 9-00 | 45 | 134.3 | 134.8 | 135.4 | 135.9 | 136.4 | 137.0 | 137.5 | 138.0 | 138.5 | 139.1 | 139.6 | 140.1 | 140.6 | 141.1 | 141.6 | 45 | 3-00 |
| | 44 | 134.1 | 134.6 | 135.2 | 135.7 | 136.3 | 136.8 | 137.3 | 137.9 | 138.4 | 138.9 | 139.5 | 140.0 | 140.5 | 141.0 | 141.5 | 44 | |
| | 43 | 133.8 | 134.4 | 135.0 | 135.5 | 136.1 | 136.6 | 137.2 | 137.7 | 138.3 | 138.8 | 139.4 | 139.9 | 140.4 | 140.9 | 141.5 | 43 | |
| | 42 | 133.6 | 134.2 | 134.7 | 135.3 | 135.9 | 136.5 | 137.0 | 137.6 | 138.1 | 138.7 | 139.2 | 139.8 | 140.3 | 140.8 | 141.4 | 42 | |
| | 41 | 133.3 | 133.9 | 134.5 | 135.1 | 135.7 | 136.3 | 136.8 | 137.4 | 138.0 | 138.5 | 139.1 | 139.6 | 140.2 | 140.8 | 141.3 | 41 | |
| | 49 | 134.2 | 134.7 | 135.2 | 135.7 | 136.2 | 136.7 | 137.2 | 137.7 | 138.1 | 138.6 | 139.1 | 139.6 | 140.0 | 140.5 | 141.0 | 49 | |
| | 48 | 134.1 | 134.6 | 135.1 | 135.6 | 136.1 | 136.6 | 137.1 | 137.6 | 138.1 | 138.5 | 139.0 | 139.5 | 140.0 | 140.5 | 141.0 | 48 | |
| | 47 | 133.9 | 134.4 | 134.9 | 135.4 | 135.9 | 136.4 | 137.0 | 137.5 | 138.0 | 138.5 | 139.0 | 139.4 | 140.0 | 140.4 | 140.9 | 47 | |
| | 46 | 133.6 | 134.2 | 134.7 | 135.3 | 135.8 | 136.3 | 136.8 | 137.4 | 137.9 | 138.4 | 138.9 | 139.4 | 139.9 | 140.4 | 140.9 | 46 | |
| 8-56 | 45 | 133.4 | 134.0 | 134.5 | 135.1 | 135.6 | 136.1 | 136.7 | 137.2 | 137.7 | 138.3 | 138.8 | 139.3 | 139.8 | 140.3 | 140.8 | 45 | 3-04 |
| | 44 | 133.2 | 133.8 | 134.3 | 134.9 | 135.4 | 136.0 | 136.5 | 137.1 | 137.6 | 138.1 | 138.7 | 139.2 | 139.7 | 140.3 | 140.8 | 44 | |
| | 43 | 133.0 | 133.5 | 134.1 | 134.7 | 135.3 | 135.8 | 136.4 | 136.9 | 137.5 | 138.0 | 138.6 | 139.1 | 139.6 | 140.2 | 140.7 | 43 | |
| | 42 | 132.7 | 133.3 | 133.9 | 134.5 | 135.1 | 135.6 | 136.2 | 136.8 | 137.3 | 137.9 | 138.4 | 139.0 | 139.5 | 140.1 | 140.6 | 42 | |
| | 41 | 132.5 | 133.1 | 133.7 | 134.3 | 134.9 | 135.4 | 136.0 | 136.6 | 137.2 | 137.7 | 138.3 | 138.9 | 139.4 | 140.0 | 140.5 | 41 | |
| | 49 | 133.4 | 133.9 | 134.4 | 134.9 | 135.4 | 135.9 | 136.4 | 136.8 | 137.3 | 137.8 | 138.3 | 138.8 | 139.3 | 139.7 | 140.2 | 49 | |
| | 48 | 133.2 | 133.7 | 134.2 | 134.7 | 135.2 | 135.7 | 136.2 | 136.7 | 137.2 | 137.7 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 48 | |
| | 47 | 133.0 | 133.5 | 134.1 | 134.6 | 135.1 | 135.6 | 136.1 | 136.7 | 137.2 | 137.7 | 138.2 | 138.7 | 139.2 | 139.7 | 140.2 | 47 | |
| | 46 | 132.8 | 133.3 | 133.9 | 134.4 | 135.0 | 135.5 | 136.0 | 136.5 | 137.1 | 137.6 | 138.1 | 138.6 | 139.1 | 139.6 | 140.1 | 46 | |
| 8-52 | 45 | 132.6 | 133.1 | 133.7 | 134.2 | 134.8 | 135.3 | 135.9 | 136.4 | 136.9 | 137.5 | 138.0 | 138.5 | 139.0 | 139.6 | 140.1 | 45 | 3-08 |
| | 44 | 132.3 | 132.9 | 133.5 | 134.1 | 134.6 | 135.2 | 135.7 | 136.3 | 136.8 | 137.4 | 137.9 | 138.4 | 139.0 | 139.5 | 140.0 | 44 | |
| | 43 | 132.1 | 132.7 | 133.3 | 133.9 | 134.4 | 135.0 | 135.6 | 136.1 | 136.7 | 137.2 | 137.8 | 138.3 | 138.9 | 139.4 | 140.0 | 43 | |
| | 42 | 131.9 | 132.5 | 133.1 | 133.7 | 134.2 | 134.8 | 135.4 | 136.0 | 136.6 | 137.1 | 137.7 | 138.2 | 138.8 | 139.3 | 139.9 | 42 | |
| | 41 | 131.6 | 132.2 | 132.8 | 133.4 | 134.1 | 134.6 | 135.2 | 135.8 | 136.4 | 137.0 | 137.5 | 138.1 | 138.7 | 139.2 | 139.8 | 41 | |
| | 49 | 132.5 | 133.0 | 133.5 | 134.0 | 134.5 | 135.0 | 135.5 | 136.0 | 136.5 | 137.0 | 137.5 | 138.0 | 138.5 | 139.0 | 139.5 | 49 | |
| | 48 | 132.3 | 132.9 | 133.4 | 133.9 | 134.4 | 134.9 | 135.4 | 135.9 | 136.4 | 136.9 | 137.4 | 137.9 | 138.4 | 138.9 | 139.4 | 48 | |
| | 47 | 132.1 | 132.7 | 133.2 | 133.7 | 134.3 | 134.8 | 135.3 | 135.8 | 136.4 | 136.9 | 137.4 | 137.9 | 138.4 | 138.9 | 139.4 | 47 | |
| | 46 | 131.9 | 132.5 | 133.0 | 133.6 | 134.1 | 134.7 | 135.2 | 135.7 | 136.3 | 136.8 | 137.3 | 137.8 | 138.3 | 138.9 | 139.4 | 46 | |
| 8-48 | 45 | 131.7 | 132.3 | 132.9 | 133.4 | 134.0 | 134.5 | 135.1 | 135.6 | 136.1 | 136.7 | 137.2 | 137.7 | 138.3 | 138.8 | 139.3 | 45 | 3-12 |
| | 44 | 131.5 | 132.1 | 132.7 | 133.2 | 133.8 | 134.4 | 134.9 | 135.5 | 136.0 | 136.6 | 137.1 | 137.7 | 138.2 | 138.8 | 139.3 | 44 | |
| | 43 | 131.3 | 131.9 | 132.5 | 133.1 | 133.6 | 134.2 | 134.8 | 135.3 | 135.9 | 136.5 | 137.0 | 137.6 | 138.1 | 138.7 | 139.2 | 43 | |
| | 42 | 131.0 | 131.7 | 132.3 | 132.9 | 133.4 | 134.0 | 134.6 | 135.2 | 135.8 | 136.3 | 136.9 | 137.5 | 138.0 | 138.6 | 139.2 | 42 | |
| | 41 | 130.8 | 131.4 | 132.0 | 132.6 | 133.3 | 133.8 | 134.4 | 135.0 | 135.6 | 136.2 | 136.8 | 137.4 | 137.9 | 138.5 | 139.1 | 41 | |
| | 49 | 131.6 | 132.2 | 132.7 | 133.2 | 133.7 | 134.2 | 134.7 | 135.2 | 135.7 | 136.2 | 136.7 | 137.2 | 137.7 | 138.2 | 138.7 | 49 | |
| | 48 | 131.5 | 132.0 | 132.5 | 133.1 | 133.6 | 134.1 | 134.6 | 135.1 | 135.6 | 136.1 | 136.7 | 137.2 | 137.7 | 138.2 | 138.7 | 48 | |
| | 47 | 131.3 | 131.8 | 132.4 | 132.9 | 133.5 | 134.0 | 134.5 | 135.0 | 135.6 | 136.1 | 136.6 | 137.1 | 137.6 | 138.1 | 138.7 | 47 | |
| | 46 | 131.1 | 131.7 | 132.2 | 132.8 | 133.3 | 133.8 | 134.4 | 134.9 | 135.5 | 136.0 | 136.5 | 137.1 | 137.6 | 138.1 | 138.6 | 46 | |
| 8-44 | 45 | 130.9 | 131.5 | 132.0 | 132.6 | 133.1 | 133.7 | 134.3 | 134.8 | 135.4 | 135.9 | 136.4 | 137.0 | 137.5 | 138.1 | 138.6 | 45 | 3-16 |
| | 44 | 130.7 | 131.3 | 131.9 | 132.4 | 133.0 | 133.6 | 134.1 | 134.7 | 135.2 | 135.8 | 136.4 | 136.9 | 137.5 | 138.0 | 138.5 | 44 | |
| | 43 | 130.4 | 131.1 | 131.7 | 132.2 | 132.8 | 133.4 | 134.0 | 134.6 | 135.1 | 135.7 | 136.3 | 136.8 | 137.4 | 137.9 | 138.5 | 43 | |
| | 42 | 130.2 | 130.8 | 131.4 | 132.1 | 132.6 | 133.2 | 133.8 | 134.4 | 135.0 | 135.6 | 136.1 | 136.7 | 137.3 | 137.9 | 138.4 | 42 | |
| | 41 | 130.0 | 130.6 | 131.2 | 131.8 | 132.5 | 133.1 | 133.7 | 134.3 | 134.9 | 135.4 | 136.0 | 136.6 | 137.2 | 137.8 | 138.4 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 123.3 | 123.9 | 124.5 | 125.1 | 125.6 | 126.2 | 126.8 | 127.3 | 127.9 | 128.4 | 129.0 | 129.5 | 130.1 | 130.6 | 131.1 | 49 | |
| | 48 | 122.9 | 123.5 | 124.1 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.6 | 128.2 | 128.8 | 129.3 | 129.9 | 130.4 | 130.9 | 48 | |
| | 47 | 122.5 | 123.1 | 123.7 | 124.4 | 125.0 | 125.6 | 126.2 | 126.8 | 127.3 | 127.9 | 128.5 | 129.1 | 129.6 | 130.2 | 130.7 | 47 | |
| | 46 | 122.0 | 122.7 | 123.3 | 124.0 | 124.6 | 125.2 | 125.8 | 126.4 | 127.0 | 127.6 | 128.2 | 128.8 | 129.4 | 130.0 | 130.5 | 46 | |
| 8-44 | 45 | 121.6 | 122.3 | 122.9 | 123.6 | 124.2 | 124.9 | 125.5 | 126.1 | 126.7 | 127.4 | 128.0 | 128.6 | 129.2 | 129.7 | 130.3 | 45 | 3-16 |
| | 44 | 121.1 | 121.8 | 122.5 | 123.2 | 123.9 | 124.5 | 125.2 | 125.8 | 126.4 | 127.1 | 127.7 | 128.3 | 128.9 | 129.5 | 130.1 | 44 | |
| | 43 | 120.7 | 121.4 | 122.1 | 122.8 | 123.5 | 124.1 | 124.8 | 125.5 | 126.1 | 126.7 | 127.4 | 128.0 | 128.6 | 129.2 | 129.8 | 43 | |
| | 42 | 120.2 | 120.9 | 121.6 | 122.4 | 123.1 | 123.7 | 124.4 | 125.1 | 125.8 | 126.4 | 127.1 | 127.7 | 128.4 | 129.0 | 129.6 | 42 | |
| | 41 | 119.7 | 120.5 | 121.2 | 121.9 | 122.6 | 123.3 | 124.0 | 124.7 | 125.4 | 126.1 | 126.8 | 127.4 | 128.1 | 128.7 | 129.3 | 41 | |
| | 49 | 122.4 | 123.0 | 123.6 | 124.2 | 124.7 | 125.3 | 125.9 | 126.5 | 127.0 | 127.6 | 128.1 | 128.7 | 129.2 | 129.7 | 130.3 | 49 | |
| | 48 | 122.0 | 122.6 | 123.2 | 123.8 | 124.4 | 125.0 | 125.6 | 126.2 | 126.7 | 127.3 | 127.9 | 128.4 | 129.0 | 129.5 | 130.1 | 48 | |
| | 47 | 121.5 | 122.2 | 122.8 | 123.4 | 124.1 | 124.7 | 125.3 | 125.9 | 126.5 | 127.0 | 127.6 | 128.2 | 128.8 | 129.3 | 129.9 | 47 | |
| | 46 | 121.1 | 121.8 | 122.4 | 123.1 | 123.7 | 124.3 | 125.0 | 125.6 | 126.2 | 126.8 | 127.4 | 128.0 | 128.5 | 129.1 | 129.7 | 46 | |
| 8-40 | 45 | 120.7 | 121.4 | 122.0 | 122.7 | 123.3 | 124.0 | 124.6 | 125.3 | 125.9 | 126.5 | 127.1 | 127.7 | 128.3 | 128.9 | 129.5 | 45 | 3-20 |
| | 44 | 120.2 | 120.9 | 121.6 | 122.3 | 123.0 | 123.6 | 124.3 | 124.9 | 125.6 | 126.2 | 126.8 | 127.4 | 128.1 | 128.7 | 129.3 | 44 | |
| | 43 | 119.8 | 120.5 | 121.2 | 121.9 | 122.6 | 123.3 | 123.9 | 124.6 | 125.2 | 125.9 | 126.5 | 127.2 | 127.8 | 128.4 | 129.0 | 43 | |
| | 42 | 119.3 | 120.0 | 120.8 | 121.5 | 122.2 | 122.9 | 123.6 | 124.2 | 124.9 | 125.6 | 126.2 | 126.9 | 127.5 | 128.2 | 128.8 | 42 | |
| | 41 | 118.8 | 119.6 | 120.3 | 121.1 | 121.8 | 122.5 | 123.2 | 123.9 | 124.6 | 125.3 | 125.9 | 126.6 | 127.2 | 127.9 | 128.5 | 41 | |
| | 49 | 121.4 | 122.0 | 122.7 | 123.3 | 123.8 | 124.4 | 125.0 | 125.6 | 126.1 | 126.7 | 127.2 | 127.8 | 128.3 | 128.9 | 129.4 | 49 | |
| | 48 | 121.0 | 121.7 | 122.3 | 122.9 | 123.5 | 124.1 | 124.7 | 125.3 | 125.9 | 126.4 | 127.0 | 127.6 | 128.1 | 128.7 | 129.2 | 48 | |
| | 47 | 120.6 | 121.3 | 121.9 | 122.6 | 123.2 | 123.8 | 124.4 | 125.0 | 125.6 | 126.2 | 126.8 | 127.3 | 127.9 | 128.5 | 129.1 | 47 | |
| | 46 | 120.2 | 120.9 | 121.5 | 122.2 | 122.8 | 123.5 | 124.1 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.7 | 128.3 | 128.9 | 46 | |
| 8-36 | 45 | 119.8 | 120.5 | 121.2 | 121.8 | 122.5 | 123.1 | 123.8 | 124.4 | 125.0 | 125.6 | 126.3 | 126.9 | 127.5 | 128.1 | 128.6 | 45 | 3-24 |
| | 44 | 119.4 | 120.1 | 120.8 | 121.4 | 122.1 | 122.8 | 123.4 | 124.1 | 124.7 | 125.4 | 126.0 | 126.6 | 127.2 | 127.8 | 128.4 | 44 | |
| | 43 | 118.9 | 119.6 | 120.3 | 121.0 | 121.7 | 122.4 | 123.1 | 123.7 | 124.4 | 125.1 | 125.7 | 126.3 | 127.0 | 127.6 | 128.2 | 43 | |
| | 42 | 118.5 | 119.2 | 119.9 | 120.6 | 121.3 | 122.0 | 122.7 | 123.4 | 124.1 | 124.7 | 125.4 | 126.1 | 126.7 | 127.3 | 128.0 | 42 | |
| | 41 | 118.0 | 118.7 | 119.5 | 120.2 | 120.9 | 121.6 | 122.3 | 123.1 | 123.7 | 124.4 | 125.1 | 125.8 | 126.4 | 127.1 | 127.7 | 41 | |
| | 49 | 120.5 | 121.1 | 121.8 | 122.4 | 122.9 | 123.5 | 124.1 | 124.7 | 125.3 | 125.8 | 126.4 | 126.9 | 127.5 | 128.0 | 128.6 | 49 | |
| | 48 | 120.1 | 120.8 | 121.4 | 122.0 | 122.6 | 123.2 | 123.8 | 124.4 | 125.0 | 125.6 | 126.2 | 126.7 | 127.3 | 127.8 | 128.4 | 48 | |
| | 47 | 119.8 | 120.4 | 121.0 | 121.7 | 122.3 | 122.9 | 123.5 | 124.1 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.7 | 128.2 | 47 | |
| | 46 | 119.3 | 120.0 | 120.7 | 121.3 | 122.0 | 122.6 | 123.2 | 123.8 | 124.5 | 125.1 | 125.7 | 126.3 | 126.9 | 127.4 | 128.0 | 46 | |
| 8-32 | 45 | 118.9 | 119.6 | 120.3 | 121.0 | 121.6 | 122.3 | 122.9 | 123.5 | 124.2 | 124.8 | 125.4 | 126.0 | 126.6 | 127.2 | 127.8 | 45 | 3-28 |
| | 44 | 118.5 | 119.2 | 119.9 | 120.6 | 121.3 | 121.9 | 122.6 | 123.2 | 123.9 | 124.5 | 125.1 | 125.8 | 126.4 | 127.0 | 127.6 | 44 | |
| | 43 | 118.1 | 118.8 | 119.5 | 120.2 | 120.9 | 121.6 | 122.2 | 122.9 | 123.6 | 124.2 | 124.9 | 125.5 | 126.1 | 126.8 | 127.4 | 43 | |
| | 42 | 117.6 | 118.3 | 119.1 | 119.8 | 120.5 | 121.2 | 121.9 | 122.6 | 123.2 | 123.9 | 124.6 | 125.2 | 125.9 | 126.5 | 127.2 | 42 | |
| | 41 | 117.1 | 117.9 | 118.6 | 119.4 | 120.1 | 120.8 | 121.5 | 122.2 | 122.9 | 123.6 | 124.3 | 125.0 | 125.6 | 126.3 | 126.9 | 41 | |
| | 49 | 119.6 | 120.2 | 120.9 | 121.5 | 122.1 | 122.7 | 123.2 | 123.8 | 124.4 | 125.0 | 125.5 | 126.1 | 126.6 | 127.2 | 127.7 | 49 | |
| | 48 | 119.3 | 119.9 | 120.5 | 121.1 | 121.8 | 122.4 | 123.0 | 123.5 | 124.1 | 124.7 | 125.3 | 125.9 | 126.4 | 127.0 | 127.6 | 48 | |
| | 47 | 118.9 | 119.5 | 120.2 | 120.8 | 121.4 | 122.1 | 122.7 | 123.3 | 123.9 | 124.5 | 125.1 | 125.7 | 126.2 | 126.8 | 127.4 | 47 | |
| | 46 | 118.5 | 119.1 | 119.8 | 120.5 | 121.1 | 121.7 | 122.4 | 123.0 | 123.6 | 124.2 | 124.8 | 125.4 | 126.0 | 126.6 | 127.2 | 46 | |
| 8-28 | 45 | 118.1 | 118.8 | 119.4 | 120.1 | 120.8 | 121.4 | 122.1 | 122.7 | 123.3 | 124.0 | 124.6 | 125.2 | 125.8 | 126.4 | 127.0 | 45 | 3-32 |
| | 44 | 117.6 | 118.3 | 119.0 | 119.7 | 120.4 | 121.1 | 121.7 | 122.4 | 123.0 | 123.7 | 124.3 | 124.9 | 125.6 | 126.2 | 126.8 | 44 | |
| | 43 | 117.2 | 117.9 | 118.6 | 119.3 | 120.0 | 120.7 | 121.4 | 122.1 | 122.7 | 123.4 | 124.0 | 124.7 | 125.3 | 126.0 | 126.6 | 43 | |
| | 42 | 116.8 | 117.5 | 118.2 | 119.0 | 119.7 | 120.4 | 121.1 | 121.7 | 122.4 | 123.1 | 123.8 | 124.4 | 125.1 | 125.7 | 126.4 | 42 | |
| | 41 | 116.3 | 117.1 | 117.8 | 118.5 | 119.3 | 120.0 | 120.7 | 121.4 | 122.1 | 122.8 | 123.5 | 124.2 | 124.8 | 125.5 | 126.1 | 41 | |
| | 49 | 118.8 | 119.4 | 120.0 | 120.6 | 121.2 | 121.8 | 122.4 | 122.9 | 123.5 | 124.1 | 124.6 | 125.2 | 125.8 | 126.3 | 126.9 | 49 | |
| | 48 | 118.4 | 119.0 | 119.6 | 120.3 | 120.9 | 121.5 | 122.1 | 122.7 | 123.3 | 123.9 | 124.5 | 125.0 | 125.6 | 126.2 | 126.7 | 48 | |
| | 47 | 118.0 | 118.6 | 119.3 | 119.9 | 120.6 | 121.2 | 121.8 | 122.4 | 123.0 | 123.6 | 124.2 | 124.8 | 125.4 | 126.0 | 126.6 | 47 | |
| | 46 | 117.6 | 118.3 | 118.9 | 119.6 | 120.2 | 120.9 | 121.5 | 122.1 | 122.8 | 123.4 | 124.0 | 124.6 | 125.2 | 125.8 | 126.4 | 46 | |
| 8-24 | 45 | 117.2 | 117.9 | 118.6 | 119.2 | 119.9 | 120.4 | 121.2 | 121.9 | 122.5 | 123.1 | 123.7 | 124.4 | 125.0 | 125.6 | 126.2 | 45 | 3-36 |
| | 44 | 116.8 | 117.5 | 118.2 | 118.9 | 119.6 | 120.2 | 120.9 | 121.6 | 122.2 | 122.9 | 123.5 | 124.1 | 124.8 | 125.4 | 126.0 | 44 | |
| | 43 | 116.4 | 117.1 | 117.8 | 118.5 | 119.2 | 119.9 | 120.6 | 121.2 | 121.9 | 122.6 | 123.3 | 123.9 | 124.5 | 125.2 | 125.8 | 43 | |
| | 42 | 115.9 | 116.7 | 117.4 | 118.1 | 118.8 | 119.5 | 120.2 | 120.9 | 121.6 | 122.3 | 123.0 | 123.6 | 124.3 | 124.9 | 125.6 | 42 | |
| | 41 | 115.5 | 116.2 | 117.0 | 117.7 | 118.4 | 119.2 | 119.9 | 120.6 | 121.3 | 122.0 | 122.7 | 123.4 | 124.0 | 124.7 | 125.3 | 41 | |
| | 49 | 117.9 | 118.5 | 119.1 | 119.7 | 120.3 | 120.9 | 121.5 | 122.1 | 122.7 | 123.2 | 123.8 | 124.4 | 124.9 | 125.5 | 126.1 | 49 | |
| | 48 | 117.5 | 118.1 | 118.8 | 119.4 | 120.0 | 120.6 | 121.2 | 121.8 | 122.4 | 123.0 | 123.6 | 124.2 | 124.8 | 125.3 | 125.9 | 48 | |
| | 47 | 117.1 | 117.8 | 118.4 | 119.1 | 119.7 | 120.3 | 121.0 | 121.6 | 122.2 | 122.8 | 123.4 | 124.0 | 124.6 | 125.2 | 125.8 | 47 | |
| | 46 | 116.7 | 117.4 | 118.1 | 118.7 | 119.4 | 120.0 | 120.7 | 121.3 | 121.9 | 122.5 | 123.2 | 123.8 | 124.4 | 125.0 | 125.6 | 46 | |
| 8-20 | 45 | 116.3 | 117.0 | 117.7 | 118.4 | 119.1 | 119.7 | 120.4 | 121.0 | 121.7 | 122.3 | 122.9 | 123.5 | 124.2 | 124.8 | 125.4 | 45 | 3-40 |
| | 44 | 115.9 | 116.7 | 117.4 | 118.0 | 118.7 | 119.4 | 120.1 | 120.7 | 121.4 | 122.0 | 122.7 | 123.3 | 124.0 | 124.6 | 125.2 | 44 | |
| | 43 | 115.5 | 116.3 | 117.0 | 117.7 | 118.4 | 119.1 | 119.8 | 120.4 | 121.1 | 121.8 | 122.4 | 123.1 | 123.7 | 124.4 | 125.0 | 43 | |
| | 42 | 115.1 | 115.9 | 116.6 | 117.3 | 118.0 | 118.7 | 119.4 | 120.1 | 120.8 | 121.5 | 122.2 | 122.8 | 123.5 | 124.1 | 124.8 | 42 | |
| | 41 | 114.7 | 115.4 | 116.2 | 116.9 | 117.7 | 118.4 | 119.1 | 119.8 | 120.5 | 121.2 | 121.9 | 122.6 | 123.2 | 123.9 | 124.6 | 41 | |
| | 49 | 117.0 | 117.6 | 118.2 | 118.8 | 119.4 | 120.1 | 120.6 | 121.2 | 121.8 | 122.4 | 123.0 | 123.6 | 124.1 | 124.7 | 125.2 | 49 | |
| | 48 | 116.6 | 117.3 | 117.9 | 118.5 | 119.2 | 119.8 | 120.4 | 121.0 | 121.6 | 122.2 | 122.8 | 123.4 | 123.9 | 124.5 | 125.1 | 48 | |
| | 47 | 116.3 | 116.9 | 117.6 | 118.2 | 118.9 | 119.5 | 120.1 | 120.7 | 121.4 | 122.0 | 122.6 | 123.2 | 123.8 | 124.4 | 124.9 | 47 | |
| | 46 | 115.9 | 116.6 | 117.2 | 117.9 | 118.5 | 119.2 | 119.8 | 120.5 | 121.1 | 121.7 | 122.4 | 123.0 | 123.6 | 124.2 | 124.8 | 46 | |
| 8-16 | 45 | 115.5 | 116.2 | 116.9 | 117.6 | 118.2 | 118.9 | 119.5 | 120.2 | 120.8 | 121.5 | 122.1 | 122.7 | 123.4 | 124.0 | 124.6 | 45 | 3-44 |
| | 44 | 115.1 | 115.8 | 116.5 | 117.2 | 117.9 | 118.6 | 119.3 | 119.9 | 120.6 | 121.2 | 121.9 | 122.5 | 123.2 | 123.8 | 124.4 | 44 | |
| | 43 | 114.7 | 115.4 | 116.2 | 116.9 | 117.6 | 118.3 | 118.9 | 119.6 | 120.3 | 121.0 | 121.6 | 122.3 | 122.9 | 123.6 | 124.2 | 43 | |
| | 42 | 114.3 | 115.0 | 115.8 | 116.5 | 117.2 | 117.9 | 118.6 | 119.3 | 120.0 | 120.7 | 121.4 | 122.0 | 122.7 | 123.4 | 124.0 | 42 | |
| | 41 | 113.9 | 114.6 | 115.4 | 116.1 | 116.8 | 117.6 | 118.3 | 119.0 | 119.7 | 120.4 | 121.1 | 121.8 | 122.5 | 123.1 | 123.8 | 41 | |
| | 49 | 116.1 | 116.7 | 117.4 | 118.0 | 118.6 | 119.2 | 119.8 | 120.4 | 121.0 | 121.6 | 122.1 | 122.7 | 123.3 | 123.8 | 124.4 | 49 | |
| | 48 | 115.8 | 116.4 | 117.0 | 117.7 | 118.3 | 118.9 | 119.5 | 120.1 | 120.8 | 121.4 | 121.9 | 122.5 | 123.1 | 123.7 | 124.3 | 48 | |
| | 47 | 115.4 | 116.1 | 116.7 | 117.4 | 118.0 | 118.6 | 119.3 | 119.9 | 120.5 | 121.1 | 121.7 | 122.3 | 122.9 | 123.5 | 124.1 | 47 | |
| | 46 | 115.0 | 115.7 | 116.4 | 117.1 | 117.7 | 118.4 | 119.0 | 119.6 | 120.3 | 120.9 | 121.5 | 122.2 | 122.8 | 123.4 | 124.0 | 46 | |
| 8-12 | 45 | 114.7 | 115.4 | 116.0 | 116.7 | 117.4 | 118.1 | 118.7 | 119.4 | 120.0 | 120.7 | 121.3 | 121.9 | 122.6 | 123.2 | 123.8 | 45 | 3-48 |
| | 44 | 114.3 | 115.0 | 115.7 | 116.4 | 117.1 | 117.8 | 118.4 | 119.1 | 119.8 | 120.4 | 121.1 | 121.7 | 122.4 | 123.0 | 123.6 | 44 | |
| | 43 | 113.9 | 114.6 | 115.3 | 116.0 | 116.7 | 117.4 | 118.1 | 118.8 | 119.5 | 120.2 | 120.8 | 121.5 | 122.1 | 122.8 | 123.4 | 43 | |
| | 42 | 113.5 | 114.2 | 115.0 | 115.7 | 116.4 | 117.1 | 117.8 | 118.5 | 119.2 | 119.9 | 120.6 | 121.3 | 121.9 | 122.6 | 123.3 | 42 | |
| | 41 | 113.1 | 113.8 | 114.6 | 115.3 | 116.1 | 116.8 | 117.5 | 118.2 | 118.9 | 119.6 | 120.3 | 121.0 | 121.7 | 122.4 | 123.0 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 131.6 | 132.2 | 132.7 | 133.2 | 133.7 | 134.2 | 134.7 | 135.2 | 135.7 | 136.2 | 136.7 | 137.2 | 137.7 | 138.2 | 138.7 | 49 | |
| | 48 | 131.5 | 132.0 | 132.5 | 133.1 | 133.6 | 134.1 | 134.6 | 135.1 | 135.6 | 136.1 | 136.7 | 137.2 | 137.7 | 138.2 | 138.7 | 48 | |
| | 47 | 131.3 | 131.8 | 132.4 | 132.9 | 133.5 | 134.0 | 134.5 | 135.0 | 135.6 | 136.1 | 136.6 | 137.1 | 137.6 | 138.1 | 138.7 | 47 | |
| | 46 | 131.1 | 131.7 | 132.2 | 132.8 | 133.3 | 133.8 | 134.4 | 134.9 | 135.5 | 136.0 | 136.5 | 137.1 | 137.6 | 138.1 | 138.6 | 46 | |
| 8-44 | 45 | 130.9 | 131.5 | 132.0 | 132.6 | 133.1 | 133.7 | 134.3 | 134.8 | 135.4 | 135.9 | 136.4 | 137.0 | 137.5 | 138.1 | 138.6 | 45 | 3-16 |
| | 44 | 130.7 | 131.3 | 131.9 | 132.4 | 133.0 | 133.6 | 134.1 | 134.7 | 135.2 | 135.8 | 136.4 | 136.9 | 137.5 | 138.0 | 138.5 | 44 | |
| | 43 | 130.4 | 131.1 | 131.7 | 132.2 | 132.8 | 133.4 | 134.0 | 134.6 | 135.1 | 135.7 | 136.3 | 136.8 | 137.4 | 137.9 | 138.5 | 43 | |
| | 42 | 130.2 | 130.8 | 131.4 | 132.1 | 132.6 | 133.2 | 133.8 | 134.4 | 135.0 | 135.6 | 136.1 | 136.7 | 137.3 | 137.9 | 138.4 | 42 | |
| | 41 | 130.0 | 130.6 | 131.2 | 131.8 | 132.5 | 133.1 | 133.7 | 134.3 | 134.9 | 135.4 | 136.0 | 136.6 | 137.2 | 137.8 | 138.4 | 41 | |
| | 49 | 130.7 | 131.3 | 131.8 | 132.4 | 132.9 | 133.4 | 133.9 | 134.4 | 134.9 | 135.4 | 135.9 | 136.4 | 136.9 | 137.4 | 137.9 | 49 | |
| | 48 | 130.6 | 131.2 | 131.7 | 132.2 | 132.8 | 133.3 | 133.8 | 134.3 | 134.8 | 135.4 | 135.9 | 136.4 | 136.9 | 137.4 | 137.9 | 48 | |
| | 47 | 130.4 | 131.0 | 131.5 | 132.1 | 132.6 | 133.2 | 133.7 | 134.2 | 134.8 | 135.3 | 135.8 | 136.3 | 136.9 | 137.4 | 137.9 | 47 | |
| | 46 | 130.3 | 130.8 | 131.4 | 131.9 | 132.5 | 133.0 | 133.6 | 134.1 | 134.7 | 135.2 | 135.7 | 136.3 | 136.8 | 137.4 | 137.9 | 46 | |
| 8-40 | 45 | 130.1 | 130.6 | 131.2 | 131.8 | 132.3 | 132.9 | 133.5 | 134.0 | 134.6 | 135.1 | 135.7 | 136.2 | 136.8 | 137.3 | 137.9 | 45 | 3-20 |
| | 44 | 129.9 | 130.4 | 131.0 | 131.6 | 132.2 | 132.8 | 133.3 | 133.9 | 134.5 | 135.0 | 135.6 | 136.2 | 136.7 | 137.3 | 137.8 | 44 | |
| | 43 | 129.6 | 130.2 | 130.8 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 134.4 | 134.9 | 135.5 | 136.1 | 136.6 | 137.2 | 137.8 | 43 | |
| | 42 | 129.4 | 130.0 | 130.6 | 131.3 | 131.9 | 132.5 | 133.0 | 133.6 | 134.2 | 134.8 | 135.4 | 136.0 | 136.6 | 137.1 | 137.7 | 42 | |
| | 41 | 129.2 | 129.8 | 130.4 | 131.1 | 131.7 | 132.3 | 132.9 | 133.5 | 134.1 | 134.7 | 135.3 | 135.9 | 136.5 | 137.1 | 137.7 | 41 | |
| | 49 | 130.0 | 130.5 | 131.0 | 131.5 | 132.1 | 132.6 | 133.1 | 133.6 | 134.1 | 134.6 | 135.1 | 135.6 | 136.2 | 136.7 | .... | 49 | |
| | 48 | 129.8 | 130.3 | 130.9 | 131.4 | 131.9 | 132.5 | 133.0 | 133.5 | 134.1 | 134.6 | 135.1 | 135.6 | 136.1 | 136.7 | 137.2 | 48 | |
| | 47 | 129.6 | 130.2 | 130.7 | 131.3 | 131.8 | 132.4 | 132.9 | 133.5 | 134.0 | 134.5 | 135.0 | 135.6 | 136.1 | 136.6 | 137.2 | 47 | |
| | 46 | 129.4 | 130.0 | 130.6 | 131.1 | 131.7 | 132.2 | 132.8 | 133.3 | 133.9 | 134.4 | 135.0 | 135.5 | 136.1 | 136.6 | 137.1 | 46 | |
| 8-36 | 45 | 129.2 | 129.8 | 130.4 | 131.0 | 131.5 | 132.1 | 132.7 | 133.2 | 133.8 | 134.4 | 134.9 | 135.5 | 136.0 | 136.6 | 137.1 | 45 | 3-24 |
| | 44 | 129.0 | 129.6 | 130.2 | 130.8 | 131.4 | 132.0 | 132.6 | 133.1 | 133.7 | 134.3 | 134.8 | 135.4 | 136.0 | 136.5 | 137.1 | 44 | |
| | 43 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.4 | 133.0 | 133.6 | 134.2 | 134.7 | 135.3 | 135.9 | 136.5 | 137.0 | 43 | |
| | 42 | 128.6 | 129.2 | 129.8 | 130.5 | 131.1 | 131.7 | 132.3 | 132.9 | 133.5 | 134.1 | 134.6 | 135.2 | 135.8 | 136.4 | 137.0 | 42 | |
| | 41 | 128.4 | 129.0 | 129.6 | 130.3 | 130.9 | 131.5 | 132.1 | 132.7 | 133.3 | 133.9 | 134.5 | 135.1 | 135.7 | 136.3 | 136.9 | 41 | |
| | 49 | 129.1 | 129.6 | 130.2 | 130.7 | 131.2 | 131.8 | 132.3 | 132.8 | 133.3 | 133.8 | 134.4 | 134.9 | 135.4 | 135.9 | .... | 49 | |
| | 48 | 128.9 | 129.5 | 130.1 | 130.6 | 131.1 | 131.7 | 132.2 | 132.7 | 133.3 | 133.8 | 134.3 | 134.9 | 135.4 | 135.9 | .... | 48 | |
| | 47 | 128.8 | 129.3 | 129.9 | 130.5 | 131.0 | 131.6 | 132.1 | 132.7 | 133.2 | 133.7 | 134.3 | 134.8 | 135.4 | 135.9 | 136.4 | 47 | |
| | 46 | 128.6 | 129.2 | 129.7 | 130.3 | 130.9 | 131.4 | 132.0 | 132.6 | 133.1 | 133.7 | 134.2 | 134.8 | 135.3 | 135.9 | 136.4 | 46 | |
| 8-32 | 45 | 128.4 | 129.0 | 129.6 | 130.2 | 130.7 | 131.3 | 131.9 | 132.5 | 133.0 | 133.6 | 134.2 | 134.7 | 135.3 | 135.8 | 136.4 | 45 | 3-28 |
| | 44 | 128.2 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.4 | 132.9 | 133.5 | 134.1 | 134.7 | 135.2 | 135.8 | 136.4 | 44 | |
| | 43 | 128.0 | 128.6 | 129.2 | 129.9 | 130.5 | 131.1 | 131.6 | 132.2 | 132.8 | 133.4 | 134.0 | 134.6 | 135.2 | 135.7 | 136.3 | 43 | |
| | 42 | 127.8 | 128.4 | 129.1 | 129.7 | 130.3 | 130.9 | 131.5 | 132.1 | 132.7 | 133.3 | 133.9 | 134.5 | 135.1 | 135.7 | 136.3 | 42 | |
| | 41 | 127.6 | 128.2 | 128.9 | 129.5 | 130.1 | 130.7 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 134.4 | 135.0 | 135.6 | 136.2 | 41 | |
| | 49 | 128.3 | 128.8 | 129.4 | 129.9 | 130.4 | 131.0 | 131.5 | 132.0 | 132.5 | 133.1 | 133.6 | 134.1 | 134.6 | .... | .... | 49 | |
| | 48 | 128.1 | 128.7 | 129.2 | 129.8 | 130.3 | 130.9 | 131.4 | 131.9 | 132.5 | 133.0 | 133.6 | 134.1 | 134.6 | 135.2 | .... | 48 | |
| | 47 | 128.0 | 128.5 | 129.1 | 129.7 | 130.2 | 130.8 | 131.3 | 131.9 | 132.4 | 133.0 | 133.5 | 134.1 | 134.6 | 135.1 | 135.7 | 47 | |
| | 46 | 127.8 | 128.4 | 128.9 | 129.5 | 130.1 | 130.7 | 131.2 | 131.8 | 132.3 | 132.9 | 133.5 | 134.0 | 134.6 | 135.1 | 135.7 | 46 | |
| 8-28 | 45 | 127.6 | 128.2 | 128.8 | 129.4 | 130.0 | 130.5 | 131.1 | 131.7 | 132.3 | 132.8 | 133.4 | 134.0 | 134.5 | 135.1 | 135.7 | 45 | 3-32 |
| | 44 | 127.4 | 128.0 | 128.6 | 129.2 | 129.8 | 130.4 | 131.0 | 131.6 | 132.2 | 132.8 | 133.3 | 133.9 | 134.5 | 135.1 | 135.6 | 44 | |
| | 43 | 127.2 | 127.8 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | 131.5 | 132.1 | 132.7 | 133.3 | 133.8 | 134.4 | 135.0 | 135.6 | 43 | |
| | 42 | 127.0 | 127.6 | 128.3 | 128.9 | 129.5 | 130.1 | 130.7 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 134.4 | 135.0 | 135.6 | 42 | |
| | 41 | 126.8 | 127.4 | 128.1 | 128.7 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.5 | 133.1 | 133.7 | 134.3 | 134.9 | 135.5 | 41 | |
| | 49 | 127.4 | 128.0 | 128.5 | 129.1 | 129.6 | 130.2 | 130.8 | 131.2 | 131.8 | 132.3 | 132.8 | 133.3 | .... | .... | .... | 49 | |
| | 48 | 127.3 | 127.9 | 128.4 | 129.0 | 129.5 | 130.1 | 130.6 | 131.2 | 131.7 | 132.2 | 132.8 | 133.3 | 133.9 | .... | .... | 48 | |
| | 47 | 127.1 | 127.7 | 128.3 | 128.9 | 129.4 | 130.0 | 130.5 | 131.1 | 131.7 | 132.2 | 132.8 | 133.3 | 133.9 | 134.4 | .... | 47 | |
| | 46 | 127.0 | 127.6 | 128.1 | 128.7 | 129.3 | 129.9 | 130.4 | 131.0 | 131.6 | 132.1 | 132.7 | 133.3 | 133.8 | 134.4 | 135.0 | 46 | |
| 8-24 | 45 | 126.8 | 127.4 | 128.0 | 128.6 | 129.2 | 129.8 | 130.3 | 130.9 | 131.5 | 132.1 | 132.7 | 133.2 | 133.8 | 134.4 | 134.9 | 45 | 3-36 |
| | 44 | 126.6 | 127.2 | 127.8 | 128.4 | 129.0 | 129.6 | 130.2 | 130.8 | 131.4 | 132.0 | 132.6 | 133.2 | 133.8 | 134.4 | 134.9 | 44 | |
| | 43 | 126.4 | 127.1 | 127.7 | 128.3 | 128.9 | 129.5 | 130.1 | 130.7 | 131.3 | 131.9 | 132.5 | 133.1 | 133.7 | 134.3 | 134.9 | 43 | |
| | 42 | 126.2 | 126.9 | 127.5 | 128.1 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.5 | 133.1 | 133.7 | 134.3 | 134.9 | 42 | |
| | 41 | 126.0 | 126.7 | 127.3 | 127.9 | 128.6 | 129.2 | 129.9 | 130.5 | 131.1 | 131.7 | 132.4 | 133.0 | 133.6 | 134.2 | 134.8 | 41 | |
| | 49 | 126.6 | 127.2 | 127.7 | 128.3 | 128.8 | 129.4 | 129.9 | 130.4 | 131.0 | 131.5 | 132.1 | 132.6 | .... | .... | .... | 49 | |
| | 48 | 126.5 | 127.0 | 127.6 | 128.2 | 128.7 | 129.3 | 129.8 | 130.4 | 130.9 | 131.5 | 132.0 | 132.6 | 133.1 | .... | .... | 48 | |
| | 47 | 126.3 | 126.9 | 127.5 | 128.1 | 128.6 | 129.2 | 129.8 | 130.3 | 130.9 | 131.4 | 132.0 | 132.6 | 133.1 | 133.7 | .... | 47 | |
| | 46 | 126.2 | 126.8 | 127.3 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 130.8 | 131.4 | 132.0 | 132.5 | 133.1 | 133.7 | .... | 46 | |
| 8-20 | 45 | 126.0 | 126.6 | 127.2 | 127.8 | 128.4 | 129.0 | 129.6 | 130.2 | 130.8 | 131.3 | 131.9 | 132.5 | 133.1 | 133.7 | 134.2 | 45 | 3-40 |
| | 44 | 125.8 | 126.4 | 127.1 | 127.7 | 128.3 | 128.9 | 129.5 | 130.1 | 130.7 | 131.3 | 131.9 | 132.5 | 133.1 | 133.6 | 134.2 | 44 | |
| | 43 | 125.6 | 126.3 | 126.9 | 127.5 | 128.1 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.4 | 133.0 | 133.6 | 134.2 | 43 | |
| | 42 | 125.4 | 126.1 | 126.7 | 127.4 | 128.0 | 128.6 | 129.2 | 129.9 | 130.5 | 131.1 | 131.7 | 132.3 | 132.9 | 133.6 | 134.2 | 42 | |
| | 41 | 125.2 | 125.9 | 126.5 | 127.2 | 127.8 | 128.5 | 129.1 | 129.8 | 130.4 | 131.0 | 131.6 | 132.3 | 132.9 | 133.5 | 134.1 | 41 | |
| | 49 | 125.8 | 126.4 | 126.9 | 127.5 | 128.0 | 128.6 | 129.1 | 129.7 | 130.2 | 130.7 | 131.3 | .... | .... | .... | .... | 49 | |
| | 48 | 125.7 | 126.2 | 126.8 | 127.4 | 127.9 | 128.5 | 129.0 | 129.6 | 130.2 | 130.7 | 131.3 | 131.8 | .... | .... | .... | 48 | |
| | 47 | 125.5 | 126.1 | 126.7 | 127.3 | 127.8 | 128.4 | 129.0 | 129.6 | 130.1 | 130.7 | 131.2 | 131.8 | 132.4 | .... | .... | 47 | |
| | 46 | 125.4 | 126.0 | 126.6 | 127.1 | 127.7 | 128.3 | 128.9 | 129.5 | 130.1 | 130.6 | 131.2 | 131.8 | 132.4 | 132.9 | .... | 46 | |
| 8-16 | 45 | 125.2 | 125.8 | 126.4 | 127.0 | 127.6 | 128.2 | 128.8 | 129.4 | 130.0 | 130.6 | 131.2 | 131.8 | 132.4 | 132.9 | 133.5 | 45 | 3-44 |
| | 44 | 125.0 | 125.7 | 126.3 | 126.9 | 127.5 | 128.1 | 128.7 | 129.3 | 129.9 | 130.5 | 131.1 | 131.7 | 132.3 | 132.9 | 133.5 | 44 | |
| | 43 | 124.9 | 125.5 | 126.1 | 126.8 | 127.4 | 128.0 | 128.6 | 129.2 | 129.9 | 130.5 | 131.1 | 131.7 | 132.3 | 132.9 | 133.5 | 43 | |
| | 42 | 124.7 | 125.3 | 126.0 | 126.6 | 127.2 | 127.9 | 128.5 | 129.1 | 129.8 | 130.4 | 131.0 | 131.6 | 132.2 | 132.9 | 133.5 | 42 | |
| | 41 | 124.5 | 125.1 | 125.8 | 126.4 | 127.1 | 127.7 | 128.4 | 129.0 | 129.7 | 130.3 | 130.9 | 131.6 | 132.2 | 132.8 | 133.4 | 41 | |
| | 49 | 125.0 | 125.5 | 126.1 | 126.7 | 127.2 | 127.8 | 128.3 | 128.9 | 129.4 | 130.0 | 130.5 | .... | .... | .... | .... | 49 | |
| | 48 | 124.9 | 125.4 | 126.0 | 126.6 | 127.2 | 127.7 | 128.3 | 128.8 | 129.4 | 130.0 | 130.5 | 131.1 | .... | .... | .... | 48 | |
| | 47 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.6 | 128.2 | 128.8 | 129.4 | 129.9 | 130.5 | 131.1 | .... | .... | .... | 47 | |
| | 46 | 124.6 | 125.2 | 125.8 | 126.4 | 127.0 | 127.6 | 128.1 | 128.7 | 129.3 | 129.9 | 130.5 | 131.1 | 131.6 | .... | .... | 46 | |
| 8-12 | 45 | 124.4 | 125.0 | 125.6 | 126.3 | 126.9 | 127.5 | 128.1 | 128.7 | 129.3 | 129.8 | 130.4 | 131.0 | 131.6 | 132.2 | .... | 45 | 3-48 |
| | 44 | 124.3 | 124.9 | 125.5 | 126.1 | 126.7 | 127.4 | 128.0 | 128.6 | 129.2 | 129.8 | 130.4 | 131.0 | 131.6 | 132.2 | 132.8 | 44 | |
| | 43 | 124.1 | 124.7 | 125.4 | 126.0 | 126.6 | 127.3 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 131.0 | 131.6 | 132.2 | 132.8 | 43 | |
| | 42 | 123.9 | 124.6 | 125.2 | 125.9 | 126.5 | 127.1 | 127.8 | 128.4 | 129.0 | 129.7 | 130.3 | 130.9 | 131.5 | 132.2 | 132.8 | 42 | |
| | 41 | 123.7 | 124.4 | 125.0 | 125.7 | 126.4 | 127.0 | 127.7 | 128.3 | 128.9 | 129.6 | 130.2 | 130.9 | 131.5 | 132.1 | 132.8 | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 116.1 | 116.7 | 117.4 | 118.0 | 118.6 | 119.2 | 119.8 | 120.4 | 121.0 | 121.6 | 122.1 | 122.7 | 123.3 | 123.8 | 124.4 | 49 | |
| | 48 | 115.8 | 116.4 | 117.0 | 117.7 | 118.3 | 118.9 | 119.5 | 120.1 | 120.8 | 121.4 | 121.9 | 122.5 | 123.1 | 123.7 | 124.3 | 48 | |
| | 47 | 115.4 | 116.1 | 116.7 | 117.4 | 118.0 | 118.6 | 119.3 | 119.9 | 120.5 | 121.1 | 121.7 | 122.3 | 122.9 | 123.5 | 124.1 | 47 | |
| | 46 | 115.0 | 115.7 | 116.4 | 117.1 | 117.7 | 118.4 | 119.0 | 119.6 | 120.3 | 120.9 | 121.5 | 122.2 | 122.8 | 123.4 | 124.0 | 46 | |
| 8-12 | 45 | 114.7 | 115.4 | 116.0 | 116.7 | 117.4 | 118.1 | 118.7 | 119.4 | 120.0 | 120.7 | 121.3 | 121.9 | 122.6 | 123.2 | 123.8 | 45 | 3-48 |
| | 44 | 114.3 | 115.0 | 115.7 | 116.4 | 117.1 | 117.8 | 118.4 | 119.1 | 119.8 | 120.4 | 121.1 | 121.7 | 122.4 | 123.0 | 123.6 | 44 | |
| | 43 | 113.9 | 114.6 | 115.3 | 116.0 | 116.7 | 117.4 | 118.1 | 118.8 | 119.5 | 120.2 | 120.8 | 121.5 | 122.1 | 122.8 | 123.4 | 43 | |
| | 42 | 113.5 | 114.2 | 115.0 | 115.7 | 116.4 | 117.1 | 117.8 | 118.5 | 119.2 | 119.9 | 120.6 | 121.3 | 121.9 | 122.6 | 123.3 | 42 | |
| | 41 | 113.1 | 113.8 | 114.6 | 115.3 | 116.1 | 116.8 | 117.5 | 118.2 | 118.9 | 119.6 | 120.3 | 121.0 | 121.7 | 122.4 | 123.0 | 41 | |
| | 49 | 115.2 | 115.9 | 116.5 | 117.1 | 117.7 | 118.3 | 118.9 | 119.5 | 120.1 | 120.7 | 121.3 | 121.9 | 122.5 | 123.0 | 123.6 | 49 | |
| | 48 | 114.9 | 115.6 | 116.2 | 116.8 | 117.5 | 118.1 | 118.7 | 119.3 | 119.9 | 120.5 | 121.1 | 121.7 | 122.3 | 122.9 | 123.5 | 48 | |
| | 47 | 114.6 | 115.2 | 115.9 | 116.5 | 117.2 | 117.8 | 118.4 | 119.1 | 119.7 | 120.3 | 120.9 | 121.5 | 122.1 | 122.7 | 123.3 | 47 | |
| | 46 | 114.2 | 114.9 | 115.6 | 116.2 | 116.9 | 117.5 | 118.2 | 118.8 | 119.5 | 120.1 | 120.7 | 121.4 | 122.0 | 122.6 | 123.2 | 46 | |
| 8-08 | 45 | 113.8 | 114.5 | 115.2 | 115.9 | 116.6 | 117.2 | 117.9 | 118.6 | 119.2 | 119.9 | 120.5 | 121.1 | 121.8 | 122.4 | 123.0 | 45 | 3-52 |
| | 44 | 113.5 | 114.2 | 114.9 | 115.6 | 116.3 | 117.0 | 117.6 | 118.3 | 119.0 | 119.6 | 120.3 | 120.9 | 121.6 | 122.2 | 122.9 | 44 | |
| | 43 | 113.1 | 113.8 | 114.5 | 115.2 | 115.9 | 116.6 | 117.3 | 118.0 | 118.7 | 119.4 | 120.0 | 120.7 | 121.4 | 122.0 | 122.7 | 43 | |
| | 42 | 112.7 | 113.4 | 114.2 | 114.9 | 115.6 | 116.3 | 117.0 | 117.7 | 118.4 | 119.1 | 119.8 | 120.5 | 121.2 | 121.8 | 122.5 | 42 | |
| | 41 | 112.3 | 113.1 | 113.8 | 114.5 | 115.3 | 116.0 | 116.7 | 117.4 | 118.1 | 118.9 | 119.5 | 120.2 | 120.9 | 121.6 | 122.3 | 41 | |
| | 49 | 114.4 | 115.0 | 115.7 | 116.3 | 116.9 | 117.5 | 118.1 | 118.7 | 119.3 | 119.9 | 120.5 | 121.1 | 121.7 | 122.2 | 122.8 | 49 | |
| | 48 | 114.1 | 114.7 | 115.4 | 116.0 | 116.6 | 117.3 | 117.9 | 118.5 | 119.1 | 119.7 | 120.3 | 120.9 | 121.5 | 122.1 | 122.7 | 48 | |
| | 47 | 113.7 | 114.4 | 115.1 | 115.7 | 116.3 | 117.0 | 117.6 | 118.2 | 118.9 | 119.5 | 120.1 | 120.7 | 121.3 | 121.9 | 122.5 | 47 | |
| | 46 | 113.4 | 114.1 | 114.7 | 115.4 | 116.1 | 116.7 | 117.4 | 118.0 | 118.7 | 119.3 | 119.9 | 120.6 | 121.2 | 121.8 | 122.4 | 46 | |
| 8-04 | 45 | 113.0 | 113.7 | 114.4 | 115.1 | 115.8 | 116.4 | 117.1 | 117.8 | 118.4 | 119.1 | 119.7 | 120.3 | 121.0 | 121.6 | 122.2 | 45 | 3-56 |
| | 44 | 112.7 | 113.4 | 114.1 | 114.8 | 115.5 | 116.2 | 116.8 | 117.5 | 118.2 | 118.8 | 119.5 | 120.2 | 120.8 | 121.4 | 122.1 | 44 | |
| | 43 | 112.3 | 113.0 | 113.7 | 114.4 | 115.2 | 115.9 | 116.5 | 117.2 | 117.9 | 118.6 | 119.3 | 119.9 | 120.6 | 121.3 | 121.9 | 43 | |
| | 42 | 111.9 | 112.7 | 113.4 | 114.1 | 114.8 | 115.5 | 116.3 | 117.0 | 117.7 | 118.4 | 119.0 | 119.7 | 120.4 | 121.1 | 121.7 | 42 | |
| | 41 | 111.5 | 112.3 | 113.0 | 113.8 | 114.5 | 115.2 | 116.0 | 116.7 | 117.4 | 118.1 | 118.8 | 119.5 | 120.2 | 120.9 | 121.5 | 41 | |
| | 49 | 113.6 | 114.2 | 114.8 | 115.4 | 116.1 | 116.7 | 117.3 | 117.9 | 118.5 | 119.1 | 119.7 | 120.2 | 120.8 | 121.4 | 122.0 | 49 | |
| | 48 | 113.2 | 113.9 | 114.5 | 115.2 | 115.8 | 116.4 | 117.0 | 117.7 | 118.3 | 118.9 | 119.5 | 120.1 | 120.7 | 121.3 | 121.9 | 48 | |
| | 47 | 112.9 | 113.6 | 114.2 | 114.9 | 115.5 | 116.2 | 116.8 | 117.4 | 118.1 | 118.7 | 119.3 | 119.9 | 120.5 | 121.1 | 121.7 | 47 | |
| | 46 | 112.6 | 113.2 | 113.9 | 114.6 | 115.2 | 115.9 | 116.6 | 117.2 | 117.8 | 118.5 | 119.1 | 119.7 | 120.4 | 121.0 | 121.6 | 46 | |
| 8-00 | 45 | 112.2 | 112.9 | 113.6 | 114.3 | 115.0 | 115.6 | 116.3 | 117.0 | 117.6 | 118.3 | 118.9 | 119.6 | 120.2 | 120.8 | 121.5 | 45 | 4-00 |
| | 44 | 111.9 | 112.6 | 113.3 | 114.0 | 114.7 | 115.4 | 116.0 | 116.7 | 117.4 | 118.0 | 118.7 | 119.4 | 120.0 | 120.7 | 121.3 | 44 | |
| | 43 | 111.5 | 112.2 | 112.9 | 113.7 | 114.4 | 115.1 | 115.8 | 116.5 | 117.1 | 117.8 | 118.5 | 119.2 | 119.8 | 120.5 | 121.2 | 43 | |
| | 42 | 111.1 | 111.9 | 112.6 | 113.3 | 114.1 | 114.8 | 115.5 | 116.2 | 116.9 | 117.6 | 118.3 | 119.0 | 119.6 | 120.3 | 121.0 | 42 | |
| | 41 | 110.8 | 111.5 | 112.3 | 113.0 | 113.7 | 114.5 | 115.2 | 115.9 | 116.6 | 117.3 | 118.0 | 118.7 | 119.4 | 120.1 | 120.8 | 41 | |
| | 49 | 112.7 | 113.3 | 114.0 | 114.6 | 115.2 | 115.8 | 116.4 | 117.0 | 117.7 | 118.3 | 118.8 | 119.4 | 120.0 | 120.6 | 121.2 | 49 | |
| | 48 | 112.4 | 113.0 | 113.7 | 114.3 | 115.0 | 115.6 | 116.2 | 116.8 | 117.5 | 118.1 | 118.7 | 119.3 | 119.9 | 120.5 | 121.1 | 48 | |
| | 47 | 112.1 | 112.8 | 113.4 | 114.1 | 114.7 | 115.3 | 116.0 | 116.6 | 117.3 | 117.9 | 118.5 | 119.1 | 119.7 | 120.4 | 121.0 | 47 | |
| | 46 | 111.7 | 112.4 | 113.1 | 113.8 | 114.4 | 115.1 | 115.8 | 116.4 | 117.1 | 117.7 | 118.3 | 119.0 | 119.6 | 120.2 | 120.8 | 46 | |
| 7-56 | 45 | 111.4 | 112.1 | 112.8 | 113.5 | 114.2 | 114.8 | 115.5 | 116.2 | 116.8 | 117.5 | 118.1 | 118.8 | 119.4 | 120.1 | 120.7 | 45 | 4-04 |
| | 44 | 111.1 | 111.8 | 112.5 | 113.2 | 113.9 | 114.6 | 115.3 | 115.9 | 116.6 | 117.3 | 117.9 | 118.6 | 119.3 | 119.9 | 120.6 | 44 | |
| | 43 | 110.7 | 111.4 | 112.2 | 112.9 | 113.6 | 114.3 | 115.0 | 115.7 | 116.4 | 117.1 | 117.7 | 118.4 | 119.1 | 119.7 | 120.4 | 43 | |
| | 42 | 110.4 | 111.1 | 111.8 | 112.6 | 113.3 | 114.0 | 114.7 | 115.4 | 116.1 | 116.8 | 117.5 | 118.2 | 118.9 | 119.6 | 120.2 | 42 | |
| | 41 | 110.0 | 110.8 | 111.5 | 112.3 | 113.0 | 113.7 | 114.4 | 115.2 | 115.9 | 116.6 | 117.3 | 118.0 | 118.7 | 119.4 | 120.1 | 41 | |
| | 49 | 111.9 | 112.5 | 113.1 | 113.8 | 114.4 | 115.0 | 115.6 | 116.2 | 116.8 | 117.4 | 118.0 | 118.6 | 119.2 | 119.8 | 120.4 | 49 | |
| | 48 | 111.6 | 112.2 | 112.9 | 113.5 | 114.2 | 114.8 | 115.4 | 116.0 | 116.7 | 117.3 | 117.9 | 118.5 | 119.1 | 119.7 | 120.3 | 48 | |
| | 47 | 111.3 | 111.9 | 112.6 | 113.2 | 113.9 | 114.5 | 115.2 | 115.8 | 116.5 | 117.1 | 117.7 | 118.3 | 119.0 | 119.6 | 120.2 | 47 | |
| | 46 | 110.9 | 111.6 | 112.3 | 113.0 | 113.6 | 114.3 | 115.0 | 115.6 | 116.3 | 116.9 | 117.5 | 118.2 | 118.8 | 119.4 | 120.1 | 46 | |
| 7-52 | 45 | 110.6 | 111.3 | 112.0 | 112.7 | 113.4 | 114.0 | 114.7 | 115.4 | 116.1 | 116.7 | 117.4 | 118.0 | 118.7 | 119.3 | 119.9 | 45 | 4-08 |
| | 44 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 113.8 | 114.5 | 115.1 | 115.8 | 116.5 | 117.2 | 117.8 | 118.5 | 119.1 | 119.8 | 44 | |
| | 43 | 109.9 | 110.7 | 111.4 | 112.1 | 112.8 | 113.5 | 114.2 | 114.9 | 115.6 | 116.3 | 117.0 | 117.6 | 118.3 | 119.0 | 119.7 | 43 | |
| | 42 | 109.6 | 110.3 | 111.1 | 111.8 | 112.5 | 113.3 | 114.0 | 114.7 | 115.4 | 116.1 | 116.8 | 117.5 | 118.1 | 118.8 | 119.5 | 42 | |
| | 41 | 109.2 | 110.0 | 110.8 | 111.5 | 112.2 | 113.0 | 113.7 | 114.4 | 115.1 | 115.8 | 116.5 | 117.3 | 118.0 | 118.7 | 119.3 | 41 | |
| | 49 | 111.0 | 111.7 | 112.3 | 112.9 | 113.6 | 114.2 | 114.8 | 115.4 | 116.0 | 116.6 | 117.2 | 117.8 | 118.4 | 119.0 | 119.6 | 49 | |
| | 48 | 110.8 | 111.4 | 112.1 | 112.7 | 113.3 | 114.0 | 114.6 | 115.2 | 115.9 | 116.5 | 117.1 | 117.7 | 118.3 | 118.9 | 119.5 | 48 | |
| | 47 | 110.4 | 111.1 | 111.8 | 112.4 | 113.1 | 113.7 | 114.4 | 115.0 | 115.7 | 116.3 | 116.9 | 117.5 | 118.2 | 118.8 | 119.4 | 47 | |
| | 46 | 110.1 | 110.8 | 111.5 | 112.2 | 112.8 | 113.5 | 114.2 | 114.8 | 115.5 | 116.1 | 116.8 | 117.4 | 118.0 | 118.7 | 119.3 | 46 | |
| 7-48 | 45 | 109.8 | 110.5 | 111.2 | 111.9 | 112.6 | 113.3 | 113.9 | 114.6 | 115.3 | 115.9 | 116.6 | 117.2 | 117.9 | 118.5 | 119.2 | 45 | 4-12 |
| | 44 | 109.5 | 110.2 | 110.9 | 111.6 | 112.3 | 113.0 | 113.7 | 114.4 | 115.1 | 115.7 | 116.4 | 117.1 | 117.7 | 118.4 | 119.1 | 44 | |
| | 43 | 109.2 | 109.9 | 110.6 | 111.3 | 112.1 | 112.8 | 113.5 | 114.2 | 114.9 | 115.5 | 116.2 | 116.9 | 117.6 | 118.2 | 118.9 | 43 | |
| | 42 | 108.8 | 109.6 | 110.3 | 111.0 | 111.8 | 112.5 | 113.2 | 113.9 | 114.6 | 115.3 | 116.0 | 116.7 | 117.4 | 118.1 | 118.8 | 42 | |
| | 41 | 108.5 | 109.3 | 110.0 | 110.8 | 111.5 | 112.2 | 112.9 | 113.7 | 114.4 | 115.1 | 115.8 | 116.5 | 117.2 | 117.9 | 118.6 | 41 | |
| | 49 | 110.2 | 110.9 | 111.5 | 112.1 | 112.8 | 113.4 | 114.0 | 114.6 | 115.2 | 115.8 | 116.4 | 117.0 | 117.6 | 118.2 | 118.8 | 49 | |
| | 48 | 109.9 | 110.6 | 111.2 | 111.9 | 112.5 | 113.2 | 113.8 | 114.4 | 115.1 | 115.7 | 116.3 | 116.9 | 117.5 | 118.1 | 118.7 | 48 | |
| | 47 | 109.6 | 110.3 | 111.0 | 111.6 | 112.3 | 112.9 | 113.6 | 114.2 | 114.9 | 115.5 | 116.1 | 116.8 | 117.4 | 118.0 | 118.6 | 47 | |
| | 46 | 109.3 | 110.0 | 110.7 | 111.4 | 112.1 | 112.7 | 113.4 | 114.0 | 114.7 | 115.3 | 116.0 | 116.6 | 117.3 | 117.9 | 118.5 | 46 | |
| 7-44 | 45 | 109.0 | 109.8 | 110.4 | 111.1 | 111.8 | 112.5 | 113.2 | 113.8 | 114.5 | 115.2 | 115.8 | 116.5 | 117.1 | 117.8 | 118.4 | 45 | 4-16 |
| | 44 | 108.7 | 109.4 | 110.2 | 110.9 | 111.6 | 112.2 | 112.9 | 113.6 | 114.3 | 115.0 | 115.7 | 116.3 | 117.0 | 117.6 | 118.3 | 44 | |
| | 43 | 108.4 | 109.1 | 109.9 | 110.6 | 111.3 | 112.0 | 112.7 | 113.4 | 114.1 | 114.8 | 115.5 | 116.1 | 116.8 | 117.5 | 118.2 | 43 | |
| | 42 | 108.1 | 108.8 | 109.6 | 110.3 | 111.0 | 111.8 | 112.5 | 113.2 | 113.9 | 114.6 | 115.3 | 116.0 | 116.7 | 117.4 | 118.0 | 42 | |
| | 41 | 107.8 | 108.5 | 109.3 | 110.0 | 110.8 | 111.5 | 112.2 | 112.9 | 113.7 | 114.4 | 115.1 | 115.8 | 116.5 | 117.2 | 117.9 | 41 | |
| | 49 | 109.4 | 110.0 | 110.7 | 111.3 | 111.9 | 112.6 | 113.2 | 113.8 | 114.4 | 115.0 | 115.6 | 116.2 | 116.8 | 117.4 | 118.0 | 49 | |
| | 48 | 109.1 | 109.8 | 110.4 | 111.1 | 111.7 | 112.4 | 113.0 | 113.6 | 114.3 | 114.9 | 115.5 | 116.1 | 116.7 | 117.3 | 118.0 | 48 | |
| | 47 | 108.8 | 109.5 | 110.2 | 110.8 | 111.5 | 112.1 | 112.8 | 113.4 | 114.1 | 114.7 | 115.4 | 116.0 | 116.6 | 117.2 | 117.9 | 47 | |
| | 46 | 108.6 | 109.2 | 109.9 | 110.6 | 111.3 | 111.9 | 112.6 | 113.3 | 113.9 | 114.6 | 115.2 | 115.9 | 116.5 | 117.1 | 117.8 | 46 | |
| 7-40 | 45 | 108.3 | 109.0 | 109.7 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 113.7 | 114.4 | 115.1 | 115.7 | 116.4 | 117.0 | 117.7 | 45 | 4-20 |
| | 44 | 108.0 | 108.7 | 109.4 | 110.1 | 110.8 | 111.5 | 112.2 | 112.9 | 113.5 | 114.2 | 114.9 | 115.6 | 116.2 | 116.9 | 117.6 | 44 | |
| | 43 | 107.7 | 108.4 | 109.1 | 109.8 | 110.5 | 111.2 | 111.9 | 112.7 | 113.3 | 114.0 | 114.7 | 115.4 | 116.1 | 116.8 | 117.4 | 43 | |
| | 42 | 107.3 | 108.1 | 108.8 | 109.5 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 113.8 | 114.6 | 115.2 | 115.9 | 116.6 | 117.3 | 42 | |
| | 41 | 107.0 | 107.8 | 108.5 | 109.3 | 110.0 | 110.8 | 111.5 | 112.2 | 112.9 | 113.7 | 114.4 | 115.1 | 115.8 | 116.5 | 117.2 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 125.0 | 125.5 | 126.1 | 126.7 | 127.2 | 127.8 | 128.3 | 128.9 | 129.4 | 130.0 | 130.5 | .... | .... | .... | .... | 49 | |
| | 48 | 124.9 | 125.4 | 126.0 | 126.6 | 127.2 | 127.7 | 128.3 | 128.8 | 129.4 | 130.0 | 130.5 | 131.1 | .... | .... | .... | 48 | |
| | 47 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.6 | 128.2 | 128.8 | 129.4 | 129.9 | 130.5 | 131.1 | .... | .... | .... | 47 | |
| | 46 | 124.6 | 125.2 | 125.8 | 126.4 | 127.0 | 127.6 | 128.1 | 128.7 | 129.3 | 129.9 | 130.5 | 131.1 | 131.6 | .... | .... | 46 | |
| 8-12 | 45 | 124.4 | 125.0 | 125.6 | 126.3 | 126.9 | 127.5 | 128.1 | 128.7 | 129.3 | 129.8 | 130.4 | 131.0 | 131.6 | 132.2 | .... | 45 | 3-48 |
| | 44 | 124.3 | 124.9 | 125.5 | 126.1 | 126.7 | 127.4 | 128.0 | 128.6 | 129.2 | 129.8 | 130.4 | 131.0 | 131.6 | 132.2 | 132.8 | 44 | |
| | 43 | 124.1 | 124.7 | 125.4 | 126.0 | 126.6 | 127.3 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 131.0 | 131.6 | 132.2 | 132.8 | 43 | |
| | 42 | 123.9 | 124.6 | 125.2 | 125.9 | 126.5 | 127.1 | 127.8 | 128.4 | 129.0 | 129.7 | 130.3 | 130.9 | 131.5 | 132.2 | 132.8 | 42 | |
| | 41 | 123.7 | 124.4 | 125.0 | 125.7 | 126.4 | 127.0 | 127.7 | 128.3 | 128.9 | 129.6 | 130.2 | 130.9 | 131.5 | 132.1 | 132.8 | 41 | |
| | 49 | 124.2 | 124.7 | 125.3 | 125.9 | 126.4 | 127.0 | 127.5 | 128.1 | 128.7 | 129.2 | .... | .... | .... | .... | .... | 49 | |
| | 48 | 124.1 | 124.6 | 125.2 | 125.8 | 126.4 | 126.9 | 127.5 | 128.1 | 128.6 | 129.2 | 129.8 | .... | .... | .... | .... | 48 | |
| | 47 | 123.9 | 124.5 | 125.1 | 125.7 | 126.3 | 126.9 | 127.5 | 128.0 | 128.6 | 129.2 | 129.8 | 130.3 | .... | .... | .... | 47 | |
| | 46 | 123.8 | 124.4 | 125.0 | 125.6 | 126.2 | 126.8 | 127.4 | 128.0 | 128.6 | 129.2 | 129.7 | 130.3 | 130.9 | .... | .... | 46 | |
| 8-08 | 45 | 123.6 | 124.3 | 124.9 | 125.5 | 126.1 | 126.7 | 127.3 | 127.9 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | .... | .... | 45 | 3-52 |
| | 44 | 123.5 | 124.1 | 124.7 | 125.4 | 126.0 | 126.6 | 127.2 | 127.8 | 128.5 | 129.1 | 129.7 | 130.3 | 130.9 | 131.5 | .... | 44 | |
| | 43 | 123.3 | 124.0 | 124.6 | 125.2 | 125.9 | 126.5 | 127.1 | 127.8 | 128.4 | 129.0 | 129.6 | 130.3 | 130.9 | 131.5 | 132.1 | 43 | |
| | 42 | 123.1 | 123.8 | 124.5 | 125.1 | 125.8 | 126.4 | 127.0 | 127.7 | 128.3 | 128.9 | 129.6 | 130.2 | 130.8 | 131.5 | 132.1 | 42 | |
| | 41 | 123.0 | 123.6 | 124.3 | 125.0 | 125.6 | 126.3 | 126.9 | 127.6 | 128.2 | 128.9 | 129.5 | 130.2 | 130.8 | 131.4 | 132.1 | 41 | |
| | 49 | 123.4 | 123.9 | 124.5 | 125.1 | 125.7 | 126.2 | 126.8 | 127.3 | 127.9 | 128.5 | .... | .... | .... | .... | .... | 49 | |
| | 48 | 123.3 | 123.8 | 124.4 | 125.0 | 125.6 | 126.2 | 126.7 | 127.3 | 127.9 | 128.5 | .... | .... | .... | .... | .... | 48 | |
| | 47 | 123.1 | 123.7 | 124.3 | 124.9 | 125.5 | 126.1 | 126.7 | 127.3 | 127.9 | 128.4 | 129.0 | .... | .... | .... | .... | 47 | |
| | 46 | 123.0 | 123.6 | 124.2 | 124.8 | 125.4 | 126.0 | 126.6 | 127.2 | 127.8 | 128.4 | 129.0 | 129.6 | .... | .... | .... | 46 | |
| 8-04 | 45 | 122.9 | 123.5 | 124.1 | 124.7 | 125.3 | 126.0 | 126.6 | 127.2 | 127.8 | 128.4 | 129.0 | 129.6 | 130.2 | .... | .... | 45 | 3-56 |
| | 44 | 122.7 | 123.4 | 124.0 | 124.6 | 125.2 | 125.9 | 126.5 | 127.1 | 127.7 | 128.3 | 129.0 | 129.6 | 130.2 | .... | .... | 44 | |
| | 43 | 122.6 | 123.2 | 123.9 | 124.5 | 125.1 | 125.8 | 126.4 | 127.0 | 127.7 | 128.3 | 128.9 | 129.6 | 130.2 | 130.8 | .... | 43 | |
| | 42 | 122.4 | 123.1 | 123.7 | 124.4 | 125.0 | 125.7 | 126.3 | 127.0 | 127.6 | 128.2 | 128.9 | 129.5 | 130.2 | 130.8 | 131.4 | 42 | |
| | 41 | 122.2 | 122.9 | 123.6 | 124.2 | 124.9 | 125.6 | 126.2 | 126.9 | 127.5 | 128.2 | 128.8 | 129.5 | 130.1 | 130.8 | 131.4 | 41 | |
| | 49 | 122.6 | 123.2 | 123.7 | 124.3 | 124.9 | 125.4 | 126.0 | 126.6 | 127.1 | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 122.5 | 123.1 | 123.6 | 124.2 | 124.8 | 125.4 | 126.0 | 126.6 | 127.1 | 127.7 | .... | .... | .... | .... | .... | 48 | |
| | 47 | 122.4 | 123.0 | 123.6 | 124.2 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.7 | .... | .... | .... | .... | .... | 47 | |
| | 46 | 122.2 | 122.8 | 123.5 | 124.1 | 124.7 | 125.3 | 125.9 | 126.5 | 127.1 | 127.7 | 128.3 | .... | .... | .... | .... | 46 | |
| 8-00 | 45 | 122.1 | 122.7 | 123.3 | 124.0 | 124.6 | 125.2 | 125.8 | 126.4 | 127.1 | 127.7 | 128.3 | 128.9 | .... | .... | .... | 45 | 4-00 |
| | 44 | 122.0 | 122.6 | 123.2 | 123.9 | 124.5 | 125.1 | 125.8 | 126.4 | 127.0 | 127.6 | 128.3 | 128.9 | 129.5 | .... | .... | 44 | |
| | 43 | 121.8 | 122.5 | 123.1 | 123.8 | 124.4 | 125.0 | 125.7 | 126.3 | 127.0 | 127.6 | 128.2 | 128.9 | 129.5 | 130.1 | .... | 43 | |
| | 42 | 121.6 | 122.3 | 123.0 | 123.6 | 124.3 | 124.9 | 125.6 | 126.3 | 126.9 | 127.5 | 128.2 | 128.8 | 129.5 | 130.1 | .... | 42 | |
| | 41 | 121.5 | 122.2 | 122.8 | 123.5 | 124.2 | 124.8 | 125.5 | 126.2 | 126.8 | 127.5 | 128.2 | 128.8 | 129.5 | 130.1 | 130.8 | 41 | |
| | 49 | 121.8 | 122.4 | 122.9 | 123.5 | 124.1 | 124.7 | 125.2 | 125.8 | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 121.7 | 122.3 | 122.9 | 123.5 | 124.1 | 124.6 | 125.2 | 125.8 | 126.4 | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 121.6 | 122.2 | 122.8 | 123.4 | 124.0 | 124.6 | 125.2 | 125.8 | 126.4 | 127.0 | .... | .... | .... | .... | .... | 47 | |
| | 46 | 121.5 | 122.1 | 122.7 | 123.3 | 123.9 | 124.5 | 125.1 | 125.8 | 126.4 | 127.0 | 127.6 | .... | .... | .... | .... | 46 | |
| 7-56 | 45 | 121.3 | 122.0 | 122.6 | 123.2 | 123.8 | 124.5 | 125.1 | 125.7 | 126.3 | 126.9 | 127.6 | .... | .... | .... | .... | 45 | 4-04 |
| | 44 | 121.2 | 121.8 | 122.5 | 123.1 | 123.8 | 124.4 | 125.0 | 125.7 | 126.3 | 126.9 | 127.5 | 128.2 | .... | .... | .... | 44 | |
| | 43 | 121.1 | 121.7 | 122.4 | 123.0 | 123.7 | 124.3 | 125.0 | 125.6 | 126.2 | 126.9 | 127.5 | 128.2 | 128.8 | .... | .... | 43 | |
| | 42 | 120.9 | 121.6 | 122.2 | 122.9 | 123.6 | 124.2 | 124.9 | 125.5 | 126.2 | 126.8 | 127.5 | 128.1 | 128.8 | 129.4 | .... | 42 | |
| | 41 | 120.8 | 121.4 | 122.1 | 122.8 | 123.5 | 124.1 | 124.8 | 125.5 | 126.1 | 126.8 | 127.5 | 128.1 | 128.8 | 129.4 | 129.9 | 41 | |
| | 49 | 121.0 | 121.6 | 122.2 | 122.7 | 123.3 | 123.9 | 124.5 | 125.1 | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 120.9 | 121.5 | 122.1 | 122.7 | 123.3 | 123.9 | 124.4 | 125.1 | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 120.8 | 121.4 | 122.0 | 122.6 | 123.2 | 123.8 | 124.4 | 125.0 | 125.6 | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 120.7 | 121.3 | 121.9 | 122.6 | 123.2 | 123.8 | 124.4 | 125.0 | 125.6 | 126.2 | .... | .... | .... | .... | .... | 46 | |
| 7-52 | 45 | 120.6 | 121.2 | 121.9 | 122.5 | 123.1 | 123.7 | 124.4 | 125.0 | 125.6 | 126.2 | 126.8 | .... | .... | .... | .... | 45 | 4-08 |
| | 44 | 120.5 | 121.1 | 121.7 | 122.4 | 123.0 | 123.7 | 124.3 | 124.9 | 125.6 | 126.2 | 126.8 | .... | .... | .... | .... | 44 | |
| | 43 | 120.3 | 121.0 | 121.6 | 122.3 | 122.9 | 123.6 | 124.3 | 124.9 | 125.5 | 126.2 | 126.8 | 127.5 | .... | .... | .... | 43 | |
| | 42 | 120.2 | 120.8 | 121.5 | 122.2 | 122.9 | 123.5 | 124.2 | 124.8 | 125.5 | 126.1 | 126.8 | 127.5 | 128.1 | .... | .... | 42 | |
| | 41 | 120.0 | 120.7 | 121.4 | 122.1 | 122.7 | 123.4 | 124.1 | 124.8 | 125.4 | 126.1 | 126.8 | 127.4 | 128.1 | 128.8 | .... | 41 | |
| | 49 | 120.2 | 120.8 | 121.4 | 122.0 | 122.5 | 123.1 | 123.7 | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 120.1 | 120.7 | 121.3 | 121.9 | 122.5 | 123.1 | 123.7 | 124.3 | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 120.0 | 120.6 | 121.2 | 121.9 | 122.5 | 123.1 | 123.7 | 124.3 | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 119.9 | 120.6 | 121.2 | 121.8 | 122.4 | 123.1 | 123.7 | 124.3 | 124.9 | .... | .... | .... | .... | .... | .... | 46 | |
| 7-48 | 45 | 119.8 | 120.5 | 121.1 | 121.7 | 122.4 | 123.0 | 123.6 | 124.3 | 124.9 | 125.5 | .... | .... | .... | .... | .... | 45 | 4-12 |
| | 44 | 119.7 | 120.4 | 121.0 | 121.7 | 122.3 | 122.9 | 123.6 | 124.2 | 124.9 | 125.5 | 126.1 | .... | .... | .... | .... | 44 | |
| | 43 | 119.6 | 120.2 | 120.9 | 121.6 | 122.2 | 122.9 | 123.5 | 124.2 | 124.8 | 125.5 | 126.1 | .... | .... | .... | .... | 43 | |
| | 42 | 119.4 | 120.1 | 120.8 | 121.5 | 122.1 | 122.8 | 123.5 | 124.1 | 124.8 | 125.5 | 126.1 | 126.8 | .... | .... | .... | 42 | |
| | 41 | 119.3 | 120.0 | 120.7 | 121.4 | 122.0 | 122.7 | 123.4 | 124.1 | 124.8 | 125.4 | 126.1 | 126.8 | 127.4 | .... | .... | 41 | |
| | 49 | 119.4 | 120.0 | 120.6 | 121.2 | 121.8 | 122.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 119.3 | 120.0 | 120.6 | 121.2 | 121.8 | 122.4 | 122.9 | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 119.3 | 119.9 | 120.5 | 121.1 | 121.7 | 122.3 | 122.9 | 123.5 | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 119.2 | 119.8 | 120.4 | 121.1 | 121.7 | 122.3 | 122.9 | 123.5 | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-44 | 45 | 119.1 | 119.7 | 120.4 | 121.0 | 121.6 | 122.3 | 122.9 | 123.5 | 124.2 | .... | .... | .... | .... | .... | .... | 45 | 4-16 |
| | 44 | 119.0 | 119.6 | 120.3 | 120.9 | 121.6 | 122.2 | 122.9 | 123.5 | 124.2 | 124.8 | .... | .... | .... | .... | .... | 44 | |
| | 43 | 118.8 | 119.5 | 120.2 | 120.9 | 121.5 | 122.2 | 122.8 | 123.5 | 124.1 | 124.8 | 125.5 | .... | .... | .... | .... | 43 | |
| | 42 | 118.7 | 119.4 | 120.1 | 120.8 | 121.4 | 122.1 | 122.8 | 123.5 | 124.1 | 124.8 | 125.4 | .... | .... | .... | .... | 42 | |
| | 41 | 118.6 | 119.3 | 120.0 | 120.7 | 121.3 | 122.0 | 122.7 | 123.4 | 124.1 | 124.8 | 125.4 | 126.1 | .... | .... | .... | 41 | |
| | 49 | 118.6 | 119.2 | 119.8 | 120.4 | 121.0 | 121.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 118.6 | 119.2 | 119.8 | 120.4 | 121.0 | 121.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 118.5 | 119.1 | 119.7 | 120.4 | 121.0 | 121.6 | 122.2 | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 118.4 | 119.0 | 119.7 | 120.3 | 120.9 | 121.6 | 122.2 | 122.8 | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-40 | 45 | 118.3 | 118.9 | 119.6 | 120.3 | 120.9 | 121.5 | 122.2 | 122.8 | .... | .... | .... | .... | .... | .... | .... | 45 | 4-20 |
| | 44 | 118.2 | 118.9 | 119.5 | 120.2 | 120.9 | 121.5 | 122.2 | 122.8 | 123.5 | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 118.1 | 118.8 | 119.5 | 120.1 | 120.8 | 121.5 | 122.1 | 122.8 | 123.5 | 124.1 | .... | .... | .... | .... | .... | 43 | |
| | 42 | 118.0 | 118.7 | 119.4 | 120.1 | 120.7 | 121.4 | 122.1 | 122.8 | 123.4 | 124.1 | 124.8 | .... | .... | .... | .... | 42 | |
| | 41 | 117.9 | 118.6 | 119.3 | 120.0 | 120.7 | 121.3 | 122.0 | 122.7 | 123.4 | 124.1 | 124.8 | .... | .... | .... | .... | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 109.4 | 110.0 | 110.7 | 111.3 | 111.9 | 112.6 | 113.2 | 113.8 | 114.4 | 115.0 | 115.6 | 116.2 | 116.8 | 117.4 | 118.0 | 49 | |
| | 48 | 109.1 | 109.8 | 110.4 | 111.1 | 111.7 | 112.4 | 113.0 | 113.6 | 114.3 | 114.9 | 115.5 | 116.1 | 116.7 | 117.3 | 118.0 | 48 | |
| | 47 | 108.8 | 109.5 | 110.2 | 110.8 | 111.5 | 112.1 | 112.8 | 113.4 | 114.1 | 114.7 | 115.4 | 116.0 | 116.6 | 117.2 | 117.9 | 47 | |
| | 46 | 108.6 | 109.2 | 109.9 | 110.6 | 111.3 | 111.9 | 112.6 | 113.3 | 113.9 | 114.6 | 115.2 | 115.9 | 116.5 | 117.1 | 117.8 | 46 | |
| 7-40 | 45 | 108.3 | 109.0 | 109.7 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 113.7 | 114.4 | 115.1 | 115.7 | 116.4 | 117.0 | 117.7 | 45 | 4-20 |
| | 44 | 108.0 | 108.7 | 109.4 | 110.1 | 110.8 | 111.5 | 112.2 | 112.9 | 113.5 | 114.2 | 114.9 | 115.6 | 116.2 | 116.9 | 117.6 | 44 | |
| | 43 | 107.7 | 108.4 | 109.1 | 109.8 | 110.5 | 111.2 | 111.9 | 112.7 | 113.3 | 114.0 | 114.7 | 115.4 | 116.1 | 116.8 | 117.4 | 43 | |
| | 42 | 107.3 | 108.1 | 108.8 | 109.5 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 113.8 | 114.6 | 115.2 | 115.9 | 116.6 | 117.3 | 42 | |
| | 41 | 107.0 | 107.8 | 108.5 | 109.3 | 110.0 | 110.8 | 111.5 | 112.2 | 112.9 | 113.7 | 114.4 | 115.1 | 115.8 | 116.5 | 117.2 | 41 | |
| | 49 | 108.6 | 109.2 | 109.9 | 110.5 | 111.1 | 111.8 | 112.4 | 113.0 | 113.6 | 114.2 | 114.8 | 115.4 | 116.0 | 116.6 | 117.3 | 49 | |
| | 48 | 108.3 | 109.0 | 109.6 | 110.3 | 110.9 | 111.6 | 112.2 | 112.8 | 113.5 | 114.1 | 114.7 | 115.3 | 116.0 | 116.6 | 117.2 | 48 | |
| | 47 | 108.0 | 108.7 | 109.4 | 110.0 | 110.7 | 111.4 | 112.0 | 112.7 | 113.3 | 113.9 | 114.6 | 115.2 | 115.9 | 116.5 | 117.1 | 47 | |
| | 46 | 107.8 | 108.4 | 109.1 | 109.8 | 110.5 | 111.1 | 111.8 | 112.5 | 113.1 | 113.8 | 114.4 | 115.1 | 115.7 | 116.4 | 117.0 | 46 | |
| 7-36 | 45 | 107.5 | 108.2 | 108.9 | 109.6 | 110.3 | 110.9 | 111.6 | 112.3 | 113.0 | 113.6 | 114.3 | 115.0 | 115.6 | 116.3 | 116.9 | 45 | 4-24 |
| | 44 | 107.2 | 107.9 | 108.6 | 109.3 | 110.0 | 110.7 | 111.4 | 112.1 | 112.8 | 113.5 | 114.2 | 114.8 | 115.5 | 116.2 | 116.8 | 44 | |
| | 43 | 106.9 | 107.6 | 108.4 | 109.1 | 109.8 | 110.5 | 111.2 | 111.9 | 112.6 | 113.3 | 114.0 | 114.7 | 115.4 | 116.0 | 116.7 | 43 | |
| | 42 | 106.6 | 107.3 | 108.1 | 108.8 | 109.5 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 113.8 | 114.5 | 115.2 | 115.9 | 116.6 | 42 | |
| | 41 | 106.3 | 107.0 | 107.8 | 108.6 | 109.3 | 110.0 | 110.8 | 111.5 | 112.2 | 112.9 | 113.6 | 114.4 | 115.1 | 115.8 | 116.5 | 41 | |
| | 49 | 107.8 | 108.4 | 109.1 | 109.7 | 110.3 | 111.0 | 111.6 | 112.2 | 112.8 | 113.4 | 114.0 | 114.7 | 115.3 | 115.9 | 116.5 | 49 | |
| | 48 | 107.5 | 108.2 | 108.8 | 109.5 | 110.1 | 110.8 | 111.4 | 112.0 | 112.7 | 113.3 | 113.9 | 114.6 | 115.2 | 115.8 | 116.4 | 48 | |
| | 47 | 107.2 | 107.9 | 108.6 | 109.3 | 109.9 | 110.6 | 111.2 | 111.9 | 112.5 | 113.2 | 113.8 | 114.5 | 115.1 | 115.7 | 116.3 | 47 | |
| | 46 | 107.0 | 107.7 | 108.4 | 109.0 | 109.7 | 110.4 | 111.0 | 111.7 | 112.4 | 113.0 | 113.7 | 114.3 | 115.0 | 115.6 | 116.3 | 46 | |
| 7-32 | 45 | 106.7 | 107.4 | 108.1 | 108.8 | 109.5 | 110.2 | 110.9 | 111.5 | 112.2 | 112.9 | 113.5 | 114.2 | 114.9 | 115.5 | 116.2 | 45 | 4-28 |
| | 44 | 106.4 | 107.2 | 107.9 | 108.6 | 109.3 | 110.0 | 110.7 | 111.4 | 112.0 | 112.7 | 113.4 | 114.1 | 114.8 | 115.4 | 116.1 | 44 | |
| | 43 | 106.1 | 106.9 | 107.6 | 108.3 | 109.0 | 109.8 | 110.5 | 111.2 | 111.9 | 112.6 | 113.3 | 113.9 | 114.6 | 115.3 | 116.0 | 43 | |
| | 42 | 105.9 | 106.6 | 107.3 | 108.1 | 108.8 | 109.5 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 113.8 | 114.5 | 115.2 | 115.9 | 42 | |
| | 41 | 105.6 | 106.3 | 107.1 | 107.8 | 108.6 | 109.3 | 110.0 | 110.8 | 111.5 | 112.2 | 112.9 | 113.6 | 114.4 | 115.1 | 115.8 | 41 | |
| | 49 | 107.0 | 107.6 | 108.3 | 108.9 | 109.5 | 110.2 | 110.8 | 111.4 | 112.0 | 112.6 | 113.3 | 113.9 | 114.5 | 115.1 | 115.7 | 49 | |
| | 48 | 106.7 | 107.4 | 108.0 | 108.7 | 109.3 | 110.0 | 110.6 | 111.3 | 111.9 | 112.5 | 113.2 | 113.8 | 114.4 | 115.0 | 115.7 | 48 | |
| | 47 | 106.5 | 107.1 | 107.8 | 108.5 | 109.1 | 109.8 | 110.4 | 111.1 | 111.8 | 112.4 | 113.1 | 113.7 | 114.3 | 115.0 | 115.6 | 47 | |
| | 46 | 106.2 | 106.9 | 107.6 | 108.3 | 108.9 | 109.6 | 110.3 | 110.9 | 111.6 | 112.3 | 112.9 | 113.6 | 114.2 | 114.9 | 115.5 | 46 | |
| 7-28 | 45 | 105.9 | 106.7 | 107.4 | 108.0 | 108.7 | 109.4 | 110.1 | 110.8 | 111.5 | 112.1 | 112.8 | 113.5 | 114.1 | 114.8 | 115.5 | 45 | 4-32 |
| | 44 | 105.7 | 106.4 | 107.1 | 107.8 | 108.5 | 109.2 | 109.9 | 110.6 | 111.3 | 112.0 | 112.7 | 113.3 | 114.0 | 114.7 | 115.4 | 44 | |
| | 43 | 105.4 | 106.1 | 106.9 | 107.6 | 108.3 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 112.5 | 113.2 | 113.9 | 114.6 | 115.3 | 43 | |
| | 42 | 105.1 | 105.9 | 106.6 | 107.3 | 108.0 | 108.8 | 109.5 | 110.2 | 111.0 | 111.7 | 112.4 | 113.1 | 113.8 | 114.5 | 115.2 | 42 | |
| | 41 | 104.9 | 105.6 | 106.4 | 107.1 | 107.9 | 108.6 | 109.3 | 110.1 | 110.8 | 111.5 | 112.2 | 112.9 | 113.7 | 114.4 | 115.1 | 41 | |
| | 49 | 106.2 | 106.8 | 107.5 | 108.1 | 108.7 | 109.4 | 110.0 | 110.6 | 111.2 | 111.9 | 112.5 | 113.1 | 113.7 | 114.3 | 114.9 | 49 | |
| | 48 | 105.9 | 106.6 | 107.2 | 107.9 | 108.5 | 109.2 | 109.8 | 110.5 | 111.1 | 111.7 | 112.4 | 113.0 | 113.7 | 114.3 | 114.9 | 48 | |
| | 47 | 105.7 | 106.4 | 107.0 | 107.7 | 108.4 | 109.0 | 109.7 | 110.3 | 111.0 | 111.6 | 112.3 | 112.9 | 113.6 | 114.2 | 114.8 | 47 | |
| | 46 | 105.4 | 106.1 | 106.8 | 107.5 | 108.2 | 108.8 | 109.5 | 110.2 | 110.8 | 111.5 | 112.2 | 112.8 | 113.5 | 114.1 | 114.8 | 46 | |
| 7-24 | 45 | 105.2 | 105.9 | 106.6 | 107.3 | 108.0 | 108.7 | 109.4 | 110.0 | 110.7 | 111.4 | 112.1 | 112.7 | 113.4 | 114.1 | 114.7 | 45 | 4-36 |
| | 44 | 104.9 | 105.7 | 106.4 | 107.1 | 107.8 | 108.5 | 109.2 | 109.9 | 110.6 | 111.3 | 111.9 | 112.6 | 113.3 | 114.0 | 114.7 | 44 | |
| | 43 | 104.7 | 105.4 | 106.1 | 106.9 | 107.6 | 108.3 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 112.5 | 113.2 | 113.9 | 114.6 | 43 | |
| | 42 | 104.4 | 105.2 | 105.9 | 106.6 | 107.4 | 108.1 | 108.8 | 109.5 | 110.2 | 111.0 | 111.7 | 112.4 | 113.1 | 113.8 | 114.5 | 42 | |
| | 41 | 104.1 | 104.9 | 105.7 | 106.4 | 107.1 | 107.9 | 108.6 | 109.4 | 110.1 | 110.8 | 111.5 | 112.2 | 113.0 | 113.7 | 114.4 | 41 | |
| | 49 | 105.4 | 106.0 | 106.7 | 107.3 | 107.9 | 108.6 | 109.2 | 109.8 | 110.5 | 111.1 | 111.7 | 112.3 | 112.9 | 113.6 | 114.2 | 49 | |
| | 48 | 105.1 | 105.8 | 106.5 | 107.1 | 107.8 | 108.4 | 109.1 | 109.7 | 110.3 | 111.0 | 111.6 | 112.2 | 112.9 | 113.5 | 114.1 | 48 | |
| | 47 | 104.9 | 105.6 | 106.3 | 106.9 | 107.6 | 108.3 | 108.9 | 109.6 | 110.2 | 110.9 | 111.5 | 112.2 | 112.8 | 113.5 | 114.1 | 47 | |
| | 46 | 104.7 | 105.4 | 106.1 | 106.7 | 107.4 | 108.1 | 108.8 | 109.4 | 110.1 | 110.8 | 111.4 | 112.1 | 112.7 | 113.4 | 114.1 | 46 | |
| 7-20 | 45 | 104.4 | 105.1 | 105.8 | 106.5 | 107.2 | 107.9 | 108.6 | 109.3 | 110.0 | 110.6 | 111.3 | 112.0 | 112.7 | 113.3 | 114.0 | 45 | 4-40 |
| | 44 | 104.2 | 104.9 | 105.6 | 106.3 | 107.0 | 107.7 | 108.4 | 109.1 | 109.8 | 110.5 | 111.2 | 111.9 | 112.6 | 113.3 | 113.9 | 44 | |
| | 43 | 103.9 | 104.7 | 105.4 | 106.1 | 106.8 | 107.6 | 108.3 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 112.5 | 113.2 | 113.9 | 43 | |
| | 42 | 103.7 | 104.4 | 105.2 | 105.9 | 106.6 | 107.4 | 108.1 | 108.8 | 109.5 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 113.8 | 42 | |
| | 41 | 103.4 | 104.2 | 104.9 | 105.7 | 106.4 | 107.2 | 107.9 | 108.7 | 109.4 | 110.1 | 110.8 | 111.6 | 112.3 | 113.0 | 113.7 | 41 | |
| | 49 | 104.6 | 105.2 | 105.9 | 106.5 | 107.1 | 107.8 | 108.4 | 109.0 | 109.7 | 110.3 | 110.9 | 111.5 | 112.2 | 112.8 | 113.4 | 49 | |
| | 48 | 104.4 | 105.0 | 105.7 | 106.3 | 107.0 | 107.6 | 108.3 | 108.9 | 109.6 | 110.2 | 110.9 | 111.5 | 112.1 | 112.8 | 113.4 | 48 | |
| | 47 | 104.1 | 104.8 | 105.5 | 106.2 | 106.8 | 107.5 | 108.1 | 108.8 | 109.5 | 110.1 | 110.8 | 111.4 | 112.1 | 112.7 | 113.4 | 47 | |
| | 46 | 103.9 | 104.6 | 105.3 | 106.0 | 106.7 | 107.3 | 108.0 | 108.7 | 109.3 | 110.0 | 110.7 | 111.3 | 112.0 | 112.7 | 113.3 | 46 | |
| 7-16 | 45 | 103.7 | 104.4 | 105.1 | 105.8 | 106.5 | 107.2 | 107.9 | 108.5 | 109.2 | 109.9 | 110.6 | 111.3 | 111.9 | 112.6 | 113.3 | 45 | 4-44 |
| | 44 | 103.5 | 104.2 | 104.9 | 105.6 | 106.3 | 107.0 | 107.7 | 108.4 | 109.1 | 109.8 | 110.5 | 111.2 | 111.9 | 112.5 | 113.2 | 44 | |
| | 43 | 103.2 | 104.0 | 104.7 | 105.4 | 106.1 | 106.8 | 107.6 | 108.3 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 112.5 | 113.2 | 43 | |
| | 42 | 103.0 | 103.7 | 104.5 | 105.2 | 105.9 | 106.7 | 107.4 | 108.1 | 108.8 | 109.5 | 110.3 | 111.0 | 111.7 | 112.4 | 113.1 | 42 | |
| | 41 | 102.7 | 103.5 | 104.2 | 105.0 | 105.7 | 106.5 | 107.2 | 108.0 | 108.7 | 109.4 | 110.1 | 110.9 | 111.6 | 112.3 | 113.0 | 41 | |
| | 49 | 103.8 | 104.4 | 105.1 | 105.7 | 106.4 | 107.0 | 107.6 | 108.3 | 108.9 | 109.5 | 110.2 | 110.8 | 111.4 | 112.0 | 112.7 | 49 | |
| | 48 | 103.6 | 104.2 | 104.9 | 105.6 | 106.2 | 106.9 | 107.5 | 108.2 | 108.8 | 109.4 | 110.1 | 110.7 | 111.4 | 112.0 | 112.6 | 48 | |
| | 47 | 103.4 | 104.0 | 104.7 | 105.4 | 106.1 | 106.7 | 107.4 | 108.0 | 108.7 | 109.4 | 110.0 | 110.7 | 111.3 | 112.0 | 112.6 | 47 | |
| | 46 | 103.2 | 103.9 | 104.5 | 105.2 | 105.9 | 106.6 | 107.3 | 107.9 | 108.6 | 109.3 | 109.9 | 110.6 | 111.3 | 111.9 | 112.6 | 46 | |
| 7-12 | 45 | 102.9 | 103.6 | 104.3 | 105.0 | 105.7 | 106.4 | 107.1 | 107.8 | 108.5 | 109.2 | 109.9 | 110.5 | 111.2 | 111.9 | 112.6 | 45 | 4-48 |
| | 44 | 102.7 | 103.4 | 104.2 | 104.9 | 105.6 | 106.3 | 107.0 | 107.7 | 108.4 | 109.1 | 109.8 | 110.4 | 111.1 | 111.8 | 112.5 | 44 | |
| | 43 | 102.5 | 103.2 | 104.0 | 104.7 | 105.4 | 106.1 | 106.8 | 107.5 | 108.3 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 112.5 | 43 | |
| | 42 | 102.3 | 103.0 | 103.8 | 104.5 | 105.2 | 106.0 | 106.7 | 107.4 | 108.1 | 108.8 | 109.6 | 110.3 | 111.0 | 111.7 | 112.4 | 42 | |
| | 41 | 102.0 | 102.8 | 103.5 | 104.3 | 105.0 | 105.8 | 106.5 | 107.3 | 108.0 | 108.7 | 109.4 | 110.2 | 110.9 | 111.6 | 112.3 | 41 | |
| | 49 | 103.0 | 103.6 | 104.3 | 104.9 | 105.6 | 106.2 | 106.9 | 107.5 | 108.1 | 108.8 | 109.4 | 110.0 | 110.6 | 111.3 | 111.9 | 49 | |
| | 48 | 102.8 | 103.5 | 104.1 | 104.8 | 105.4 | 106.1 | 106.7 | 107.4 | 108.0 | 108.7 | 109.3 | 110.0 | 110.6 | 111.3 | 111.9 | 48 | |
| | 47 | 102.6 | 103.3 | 104.0 | 104.6 | 105.3 | 106.0 | 106.6 | 107.3 | 108.0 | 108.6 | 109.3 | 109.9 | 110.6 | 111.2 | 111.9 | 47 | |
| | 46 | 102.4 | 103.1 | 103.8 | 104.5 | 105.2 | 105.8 | 106.5 | 107.2 | 107.9 | 108.5 | 109.2 | 109.9 | 110.5 | 111.2 | 111.9 | 46 | |
| 7-08 | 45 | 102.2 | 102.9 | 103.6 | 104.3 | 105.0 | 105.7 | 106.4 | 107.1 | 107.8 | 108.4 | 109.1 | 109.8 | 110.5 | 111.2 | 111.8 | 45 | 4-52 |
| | 44 | 102.0 | 102.7 | 103.4 | 104.1 | 104.9 | 105.6 | 106.3 | 107.0 | 107.7 | 108.4 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 44 | |
| | 43 | 101.8 | 102.5 | 103.3 | 104.0 | 104.7 | 105.4 | 106.1 | 106.8 | 107.5 | 108.2 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 43 | |
| | 42 | 101.6 | 102.3 | 103.1 | 103.8 | 104.5 | 105.3 | 106.0 | 106.7 | 107.4 | 108.1 | 108.9 | 109.6 | 110.3 | 111.0 | 111.7 | 42 | |
| | 41 | 101.3 | 102.1 | 102.9 | 103.6 | 104.3 | 105.1 | 105.8 | 106.6 | 107.3 | 108.0 | 108.8 | 109.5 | 110.2 | 110.9 | 111.7 | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 118.6 | 119.2 | 119.8 | 120.4 | 121.0 | 121.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 118.6 | 119.2 | 119.8 | 120.4 | 121.0 | 121.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 118.5 | 119.1 | 119.7 | 120.4 | 121.0 | 121.6 | 122.2 | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 118.4 | 119.0 | 119.7 | 120.3 | 120.9 | 121.6 | 122.2 | 122.8 | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-40 | 45 | 118.3 | 118.9 | 119.6 | 120.3 | 120.9 | 121.5 | 122.2 | 122.8 | .... | .... | .... | .... | .... | .... | .... | 45 | 4-20 |
| | 44 | 118.2 | 118.9 | 119.5 | 120.2 | 120.9 | 121.5 | 122.2 | 122.8 | 123.5 | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 118.1 | 118.8 | 119.5 | 120.1 | 120.8 | 121.5 | 122.1 | 122.8 | 123.5 | 124.1 | .... | .... | .... | .... | .... | 43 | |
| | 42 | 118.0 | 118.7 | 119.4 | 120.1 | 120.7 | 121.4 | 122.1 | 122.8 | 123.4 | 124.1 | 124.8 | .... | .... | .... | .... | 42 | |
| | 41 | 117.9 | 118.6 | 119.3 | 120.0 | 120.7 | 121.3 | 122.0 | 122.7 | 123.4 | 124.1 | 124.8 | .... | .... | .... | .... | 41 | |
| | 49 | 117.9 | 118.5 | 119.1 | 119.7 | 120.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 117.8 | 118.4 | 119.0 | 119.6 | 120.3 | 120.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 117.7 | 118.4 | 119.0 | 119.6 | 120.2 | 120.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 117.7 | 118.3 | 118.9 | 119.6 | 120.2 | 120.9 | 121.5 | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-36 | 45 | 117.6 | 118.2 | 118.9 | 119.5 | 120.2 | 120.8 | 121.5 | 122.1 | .... | .... | .... | .... | .... | .... | .... | 45 | 4-24 |
| | 44 | 117.5 | 118.2 | 118.8 | 119.5 | 120.1 | 120.8 | 121.5 | 122.1 | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 117.4 | 118.1 | 118.8 | 119.4 | 120.1 | 120.8 | 121.4 | 122.1 | 122.8 | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 117.3 | 118.0 | 118.7 | 119.4 | 120.0 | 120.7 | 121.4 | 122.1 | 122.8 | 123.4 | .... | .... | .... | .... | .... | 42 | |
| | 41 | 117.2 | 117.9 | 118.6 | 119.3 | 120.0 | 120.7 | 121.4 | 122.0 | 122.7 | 123.4 | .... | .... | .... | .... | .... | 41 | |
| | 49 | 117.1 | 117.7 | 118.3 | 118.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 117.0 | 117.7 | 118.3 | 118.9 | 119.5 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 117.0 | 117.6 | 118.2 | 118.9 | 119.5 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 116.9 | 117.6 | 118.2 | 118.9 | 119.5 | 120.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-32 | 45 | 116.9 | 117.5 | 118.2 | 118.8 | 119.5 | 120.1 | 120.8 | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 4-28 |
| | 44 | 116.8 | 117.4 | 118.1 | 118.8 | 119.4 | 120.1 | 120.8 | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 116.7 | 117.4 | 118.0 | 118.7 | 119.4 | 120.1 | 120.7 | 121.4 | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 116.6 | 117.3 | 118.0 | 118.7 | 119.3 | 120.0 | 120.7 | 121.4 | 122.1 | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 116.5 | 117.2 | 117.9 | 118.6 | 119.3 | 120.0 | 120.7 | 121.4 | 122.1 | 122.8 | .... | .... | .... | .... | .... | 41 | |
| | 49 | 116.3 | 116.9 | 117.5 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 116.3 | 116.9 | 117.5 | 118.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 116.2 | 116.9 | 117.5 | 118.1 | 118.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 116.2 | 116.8 | 117.5 | 118.1 | 118.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-28 | 45 | 116.1 | 116.8 | 117.4 | 118.1 | 118.7 | 119.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 4-32 |
| | 44 | 116.0 | 116.7 | 117.4 | 118.1 | 118.7 | 119.4 | 120.1 | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 116.0 | 116.7 | 117.3 | 118.0 | 118.7 | 119.4 | 120.0 | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 115.9 | 116.6 | 117.3 | 118.0 | 118.7 | 119.3 | 120.0 | 120.7 | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 115.8 | 116.5 | 117.2 | 117.9 | 118.6 | 119.3 | 120.0 | 120.7 | 121.4 | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 115.6 | 116.2 | 116.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 115.5 | 116.1 | 116.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 115.5 | 116.1 | 116.8 | 117.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 115.4 | 116.1 | 116.7 | 117.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-24 | 45 | 115.4 | 116.1 | 116.7 | 117.4 | 118.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 4-36 |
| | 44 | 115.3 | 116.0 | 116.7 | 117.4 | 118.0 | 118.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 115.3 | 116.0 | 116.6 | 117.3 | 118.0 | 118.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 115.2 | 115.9 | 116.6 | 117.3 | 118.0 | 118.7 | 119.4 | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 115.1 | 115.8 | 116.5 | 117.2 | 117.9 | 118.6 | 119.3 | 120.0 | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 114.8 | 115.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 114.8 | 115.4 | 116.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 114.7 | 115.4 | 116.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 114.7 | 115.4 | 116.0 | 116.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-20 | 45 | 114.7 | 115.3 | 116.0 | 116.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 4-40 |
| | 44 | 114.6 | 115.3 | 116.0 | 116.6 | 117.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 114.6 | 115.2 | 115.9 | 116.6 | 117.3 | 118.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 114.5 | 115.2 | 115.9 | 116.6 | 117.3 | 118.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 114.4 | 115.1 | 115.9 | 116.6 | 117.3 | 118.0 | 118.7 | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 114.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 114.0 | 114.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 114.0 | 114.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 114.0 | 114.6 | 115.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-16 | 45 | 113.9 | 114.6 | 115.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 4-44 |
| | 44 | 113.9 | 114.6 | 115.3 | 115.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 113.9 | 114.6 | 115.2 | 115.9 | 116.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 113.8 | 114.5 | 115.2 | 115.9 | 116.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 113.7 | 114.5 | 115.2 | 115.9 | 116.6 | 117.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 113.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 113.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 113.2 | 113.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-12 | 45 | 113.2 | 113.9 | 114.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 4-48 |
| | 44 | 113.2 | 113.9 | 114.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 113.2 | 113.9 | 114.6 | 115.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 113.1 | 113.8 | 114.5 | 115.2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 113.1 | 113.8 | 114.5 | 115.2 | 115.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 112.5 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 112.5 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 7-08 | 45 | 112.5 | 113.2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 4-52 |
| | 44 | 112.5 | 113.2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 112.5 | 113.2 | 113.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 112.4 | 113.2 | 113.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 112.4 | 113.1 | 113.8 | 114.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A.M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 103.0 | 103.6 | 104.3 | 104.9 | 105.6 | 106.2 | 106.9 | 107.5 | 108.1 | 108.8 | 109.4 | 110.0 | 110.6 | 111.3 | 111.9 | 49 | |
| | 48 | 102.8 | 103.5 | 104.1 | 104.8 | 105.4 | 106.1 | 106.7 | 107.4 | 108.0 | 108.7 | 109.3 | 110.0 | 110.6 | 111.3 | 111.9 | 48 | |
| | 47 | 102.6 | 103.3 | 104.0 | 104.6 | 105.3 | 106.0 | 106.6 | 107.3 | 108.0 | 108.6 | 109.3 | 109.9 | 110.6 | 111.2 | 111.9 | 47 | |
| | 46 | 102.4 | 103.1 | 103.8 | 104.5 | 105.2 | 105.8 | 106.5 | 107.2 | 107.9 | 108.5 | 109.2 | 109.9 | 110.5 | 111.2 | 111.9 | 46 | |
| 7-08 | 45 | 102.2 | 102.9 | 103.6 | 104.3 | 105.0 | 105.7 | 106.4 | 107.1 | 107.8 | 108.4 | 109.1 | 109.8 | 110.5 | 111.2 | 111.8 | 45 | 4-52 |
| | 44 | 102.0 | 102.7 | 103.4 | 104.1 | 104.9 | 105.6 | 106.3 | 107.0 | 107.7 | 108.4 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 44 | |
| | 43 | 101.8 | 102.5 | 103.3 | 104.0 | 104.7 | 105.4 | 106.1 | 106.8 | 107.5 | 108.2 | 109.0 | 109.7 | 110.4 | 111.1 | 111.8 | 43 | |
| | 42 | 101.6 | 102.3 | 103.1 | 103.8 | 104.5 | 105.3 | 106.0 | 106.7 | 107.4 | 108.1 | 108.9 | 109.6 | 110.3 | 111.0 | 111.7 | 42 | |
| | 41 | 101.3 | 102.1 | 102.9 | 103.6 | 104.3 | 105.1 | 105.8 | 106.6 | 107.3 | 108.0 | 108.8 | 109.5 | 110.2 | 110.9 | 111.7 | 41 | |
| | 49 | 102.2 | 102.9 | 103.5 | 104.2 | 104.8 | 105.4 | 106.1 | 106.7 | 107.4 | 108.0 | 108.6 | 109.2 | 109.9 | 110.5 | .... | 49 | |
| | 48 | 102.0 | 102.7 | 103.4 | 104.0 | 104.7 | 105.3 | 106.0 | 106.6 | 107.3 | 107.9 | 108.6 | 109.2 | 109.9 | 110.5 | .... | 48 | |
| | 47 | 101.8 | 102.5 | 103.2 | 103.9 | 104.5 | 105.2 | 105.9 | 106.5 | 107.2 | 107.9 | 108.5 | 109.2 | 109.8 | 110.5 | 111.1 | 47 | |
| | 46 | 101.7 | 102.4 | 103.0 | 103.7 | 104.4 | 105.1 | 105.8 | 106.4 | 107.1 | 107.8 | 108.5 | 109.1 | 109.8 | 110.5 | 111.1 | 46 | |
| 7-04 | 45 | 101.5 | 102.2 | 102.9 | 103.6 | 104.3 | 105.0 | 105.7 | 106.3 | 107.0 | 107.7 | 108.4 | 109.1 | 109.8 | 110.4 | 111.1 | 45 | 4-56 |
| | 44 | 101.3 | 102.0 | 102.7 | 103.4 | 104.1 | 104.8 | 105.5 | 106.2 | 106.9 | 107.6 | 108.2 | 109.0 | 109.7 | 110.4 | 111.1 | 44 | |
| | 43 | 101.1 | 101.8 | 102.5 | 103.3 | 104.0 | 104.7 | 105.4 | 106.1 | 106.8 | 107.5 | 108.3 | 109.0 | 109.7 | 110.4 | 111.1 | 43 | |
| | 42 | 100.9 | 101.6 | 102.4 | 103.1 | 103.8 | 104.6 | 105.3 | 106.0 | 106.7 | 107.5 | 108.2 | 108.9 | 109.6 | 110.3 | 111.0 | 42 | |
| | 41 | 100.7 | 101.4 | 102.2 | 102.9 | 103.7 | 104.4 | 105.1 | 105.9 | 106.6 | 107.4 | 108.1 | 108.8 | 109.5 | 110.3 | 111.0 | 41 | |
| | 49 | 101.4 | 102.1 | 102.7 | 103.4 | 104.0 | 104.7 | 105.3 | 105.9 | 106.6 | 107.2 | 107.9 | 108.5 | 109.1 | .... | .... | 49 | |
| | 48 | 101.3 | 101.9 | 102.6 | 103.3 | 103.9 | 104.6 | 105.2 | 105.9 | 106.5 | 107.2 | 107.8 | 108.5 | 109.1 | 109.8 | .... | 48 | |
| | 47 | 101.1 | 101.8 | 102.4 | 103.1 | 103.8 | 104.5 | 105.1 | 105.8 | 106.5 | 107.1 | 107.8 | 108.4 | 109.1 | 109.8 | .... | 47 | |
| | 46 | 100.9 | 101.6 | 102.3 | 103.0 | 103.7 | 104.3 | 105.0 | 105.7 | 106.4 | 107.1 | 107.7 | 108.4 | 109.1 | 109.7 | .... | 46 | |
| 7-00 | 45 | 100.7 | 101.4 | 102.1 | 102.8 | 103.5 | 104.2 | 104.9 | 105.6 | 106.3 | 107.0 | 107.7 | 108.4 | 109.0 | 109.7 | 110.4 | 45 | 5-00 |
| | 44 | 100.6 | 101.3 | 102.0 | 102.7 | 103.4 | 104.1 | 104.8 | 105.5 | 106.2 | 106.9 | 107.6 | 108.3 | 109.0 | 109.7 | 110.4 | 44 | |
| | 43 | 100.4 | 101.1 | 101.8 | 102.5 | 103.3 | 104.0 | 104.7 | 105.4 | 106.1 | 106.8 | 107.6 | 108.3 | 109.0 | 109.7 | 110.4 | 43 | |
| | 42 | 100.2 | 100.9 | 101.7 | 102.4 | 103.1 | 103.9 | 104.6 | 105.3 | 106.0 | 106.8 | 107.5 | 108.2 | 108.9 | 109.7 | 110.4 | 42 | |
| | 41 | 100.0 | 100.7 | 101.5 | 102.2 | 103.0 | 103.7 | 104.5 | 105.2 | 105.9 | 106.7 | 107.4 | 108.1 | 108.9 | 109.6 | 110.3 | 41 | |
| | 49 | 100.7 | 101.3 | 102.0 | 102.6 | 103.3 | 103.9 | 104.5 | 105.2 | 105.8 | 106.5 | 107.1 | 107.7 | .... | .... | .... | 49 | |
| | 48 | 100.5 | 101.2 | 101.8 | 102.5 | 103.1 | 103.8 | 104.5 | 105.1 | 105.8 | 106.4 | 107.1 | 107.7 | 108.4 | .... | .... | 48 | |
| | 47 | 100.3 | 101.0 | 101.7 | 102.4 | 103.0 | 103.7 | 104.4 | 105.0 | 105.7 | 106.4 | 107.0 | 107.7 | 108.4 | .... | .... | 47 | |
| | 46 | 100.2 | 100.9 | 101.6 | 102.2 | 102.9 | 103.6 | 104.3 | 105.0 | 105.7 | 106.3 | 107.0 | 107.7 | 108.3 | 109.0 | .... | 46 | |
| 6-56 | 45 | 100.0 | 100.7 | 101.4 | 102.1 | 102.8 | 103.5 | 104.2 | 104.9 | 105.6 | 106.3 | 107.0 | 107.7 | 108.3 | 109.0 | .... | 45 | 5-04 |
| | 44 | 99.8 | 100.5 | 101.3 | 102.0 | 102.7 | 103.4 | 104.1 | 104.8 | 105.5 | 106.2 | 106.9 | 107.6 | 108.3 | 109.0 | .... | 44 | |
| | 43 | 99.7 | 100.4 | 101.1 | 101.8 | 102.6 | 103.3 | 104.0 | 104.7 | 105.4 | 106.1 | 106.9 | 107.6 | 108.3 | 109.0 | 109.7 | 43 | |
| | 42 | 99.5 | 100.2 | 101.0 | 101.7 | 102.4 | 103.2 | 103.9 | 104.6 | 105.4 | 106.1 | 106.8 | 107.5 | 108.2 | 109.0 | 109.7 | 42 | |
| | 41 | 99.3 | 100.1 | 100.8 | 101.6 | 102.3 | 103.0 | 103.8 | 104.5 | 105.3 | 106.0 | 106.7 | 107.5 | 108.2 | 108.9 | 109.7 | 41 | |
| | 49 | 99.9 | 100.5 | 101.2 | 101.8 | 102.5 | 103.1 | 103.8 | 104.4 | 105.1 | 105.7 | 106.3 | .... | .... | .... | .... | 49 | |
| | 48 | 99.7 | 100.4 | 101.1 | 101.7 | 102.4 | 103.0 | 103.7 | 104.4 | 105.0 | 105.7 | 106.3 | 107.0 | .... | .... | .... | 48 | |
| | 47 | 99.6 | 100.3 | 101.0 | 101.6 | 102.3 | 103.0 | 103.6 | 104.3 | 105.0 | 105.6 | 106.3 | 107.0 | .... | .... | .... | 47 | |
| | 46 | 99.4 | 100.1 | 100.8 | 101.5 | 102.2 | 102.9 | 103.6 | 104.2 | 104.9 | 105.6 | 106.3 | 106.9 | 107.6 | .... | .... | 46 | |
| 6-52 | 45 | 99.3 | 100.0 | 100.7 | 101.4 | 102.1 | 102.8 | 103.5 | 104.2 | 104.9 | 105.6 | 106.3 | 106.9 | 107.6 | .... | .... | 45 | 5-08 |
| | 44 | 99.1 | 99.8 | 100.5 | 101.3 | 102.0 | 102.7 | 103.4 | 104.1 | 104.8 | 105.5 | 106.2 | 106.9 | 107.6 | .... | .... | 44 | |
| | 43 | 99.0 | 99.7 | 100.4 | 101.1 | 101.9 | 102.6 | 103.3 | 104.0 | 104.7 | 105.4 | 106.2 | 106.9 | 107.6 | 108.3 | .... | 43 | |
| | 42 | 98.8 | 99.5 | 100.3 | 101.0 | 101.7 | 102.5 | 103.2 | 103.9 | 104.7 | 105.4 | 106.1 | 106.5 | 107.6 | 108.3 | .... | 42 | |
| | 41 | 98.6 | 99.4 | 100.1 | 100.9 | 101.6 | 102.4 | 103.1 | 103.9 | 104.6 | 105.3 | 106.1 | 106.8 | 107.5 | 108.3 | 109.0 | 41 | |
| | 49 | 99.1 | 99.8 | 100.4 | 101.1 | 101.7 | 102.4 | 103.0 | 103.6 | 104.3 | 104.9 | 105.6 | .... | .... | .... | .... | 49 | |
| | 48 | 99.0 | 99.7 | 100.3 | 101.0 | 101.6 | 102.3 | 103.0 | 103.6 | 104.3 | 104.9 | 105.6 | .... | .... | .... | .... | 48 | |
| | 47 | 98.8 | 99.5 | 100.2 | 100.9 | 101.5 | 102.2 | 102.9 | 103.6 | 104.2 | 104.9 | 105.6 | .... | .... | .... | .... | 47 | |
| | 46 | 98.7 | 99.4 | 100.1 | 100.8 | 101.5 | 102.1 | 102.8 | 103.5 | 104.2 | 104.9 | 105.5 | 106.2 | .... | .... | .... | 46 | |
| 6-48 | 45 | 98.5 | 99.3 | 100.0 | 100.7 | 101.4 | 102.1 | 102.8 | 103.5 | 104.2 | 104.8 | 105.5 | 106.2 | .... | .... | .... | 45 | 5-12 |
| | 44 | 98.4 | 99.1 | 99.8 | 100.6 | 101.3 | 102.0 | 102.7 | 103.4 | 104.1 | 104.8 | 105.5 | 106.2 | 106.9 | .... | .... | 44 | |
| | 43 | 98.3 | 99.0 | 99.7 | 100.4 | 101.2 | 101.9 | 102.6 | 103.3 | 104.0 | 104.8 | 105.5 | 106.2 | 106.9 | .... | .... | 43 | |
| | 42 | 98.1 | 98.8 | 99.6 | 100.3 | 101.1 | 101.8 | 102.5 | 103.3 | 104.0 | 104.7 | 105.5 | 106.2 | 106.9 | .... | .... | 42 | |
| | 41 | 97.9 | 98.7 | 99.5 | 100.2 | 100.9 | 101.7 | 102.4 | 103.2 | 103.9 | 104.7 | 105.4 | 106.1 | 106.9 | 107.6 | .... | 41 | |
| | 49 | 98.4 | 99.0 | 99.7 | 100.3 | 101.0 | 101.6 | 102.2 | 102.9 | 103.5 | 104.2 | .... | .... | .... | .... | .... | 49 | |
| | 48 | 98.2 | 98.9 | 99.6 | 100.2 | 100.9 | 101.5 | 102.2 | 102.9 | 103.5 | 104.2 | .... | .... | .... | .... | .... | 48 | |
| | 47 | 98.1 | 98.8 | 99.5 | 100.1 | 100.8 | 101.5 | 102.1 | 102.8 | 103.5 | 104.2 | .... | .... | .... | .... | .... | 47 | |
| | 46 | 98.0 | 98.7 | 99.4 | 100.0 | 100.7 | 101.4 | 102.1 | 102.8 | 103.5 | 104.1 | 104.8 | .... | .... | .... | .... | 46 | |
| 6-44 | 45 | 97.8 | 98.5 | 99.2 | 99.9 | 100.6 | 101.3 | 102.0 | 102.7 | 103.4 | 104.1 | 104.8 | .... | .... | .... | .... | 45 | 5-16 |
| | 44 | 97.7 | 98.4 | 99.1 | 99.8 | 100.5 | 101.3 | 102.0 | 102.7 | 103.4 | 104.1 | 104.8 | 105.5 | .... | .... | .... | 44 | |
| | 43 | 97.6 | 98.3 | 99.0 | 99.7 | 100.5 | 101.2 | 101.9 | 102.6 | 103.4 | 104.1 | 104.8 | 105.5 | .... | .... | .... | 43 | |
| | 42 | 97.4 | 98.2 | 98.9 | 99.6 | 100.4 | 101.1 | 101.8 | 102.6 | 103.3 | 104.0 | 104.8 | 105.5 | .... | .... | .... | 42 | |
| | 41 | 97.3 | 98.0 | 98.8 | 99.5 | 100.3 | 101.0 | 101.8 | 102.5 | 103.3 | 104.0 | 104.7 | 105.5 | 106.2 | .... | .... | 41 | |
| | 49 | 97.6 | 98.2 | 98.9 | 99.5 | 100.2 | 100.8 | 101.5 | 102.1 | 102.8 | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 97.5 | 98.1 | 98.8 | 99.5 | 100.1 | 100.8 | 101.5 | 102.1 | 102.8 | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 97.4 | 98.0 | 98.7 | 99.4 | 100.1 | 100.7 | 101.4 | 102.1 | 102.8 | 103.4 | .... | .... | .... | .... | .... | 47 | |
| | 46 | 97.2 | 97.9 | 98.6 | 99.3 | 100.0 | 100.7 | 101.4 | 102.1 | 102.7 | 103.4 | .... | .... | .... | .... | .... | 46 | |
| 6-40 | 45 | 97.1 | 97.8 | 98.5 | 99.2 | 99.9 | 100.6 | 101.3 | 102.0 | 102.7 | 103.4 | .... | .... | .... | .... | .... | 45 | 5-20 |
| | 44 | 97.0 | 97.7 | 98.4 | 99.1 | 99.9 | 100.6 | 101.3 | 102.0 | 102.7 | 103.4 | 104.1 | .... | .... | .... | .... | 44 | |
| | 43 | 96.9 | 97.6 | 98.3 | 99.1 | 99.8 | 100.5 | 101.2 | 101.9 | 102.7 | 103.4 | 104.1 | .... | .... | .... | .... | 43 | |
| | 42 | 96.7 | 97.5 | 98.2 | 99.0 | 99.7 | 100.4 | 101.2 | 101.9 | 102.6 | 103.4 | 104.1 | .... | .... | .... | .... | 42 | |
| | 41 | 96.6 | 97.4 | 98.1 | 98.9 | 99.6 | 100.4 | 101.1 | 101.9 | 102.6 | 103.3 | 104.1 | 104.8 | .... | .... | .... | 41 | |
| | 49 | 96.8 | 97.5 | 98.1 | 98.8 | 99.4 | 100.1 | 100.7 | 101.4 | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 96.7 | 97.4 | 98.1 | 98.7 | 99.4 | 100.0 | 100.7 | 101.4 | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 96.6 | 97.3 | 98.0 | 98.6 | 99.3 | 100.0 | 100.7 | 101.4 | 102.0 | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 96.5 | 97.2 | 97.9 | 98.6 | 99.3 | 99.9 | 100.6 | 101.3 | 102.0 | .... | .... | .... | .... | .... | .... | 46 | |
| 6-36 | 45 | 96.4 | 97.1 | 97.8 | 98.5 | 99.2 | 99.9 | 100.6 | 101.3 | 102.0 | .... | .... | .... | .... | .... | .... | 45 | 5-24 |
| | 44 | 96.3 | 97.0 | 97.7 | 98.4 | 99.2 | 99.9 | 100.6 | 101.3 | 102.0 | 102.7 | .... | .... | .... | .... | .... | 44 | |
| | 43 | 96.3 | 97.0 | 97.7 | 98.4 | 99.2 | 99.8 | 100.5 | 101.3 | 102.0 | 102.7 | .... | .... | .... | .... | .... | 43 | |
| | 42 | 96.1 | 96.8 | 97.5 | 98.3 | 99.0 | 99.8 | 100.5 | 101.2 | 102.0 | 102.7 | .... | .... | .... | .... | .... | 42 | |
| | 41 | 95.9 | 96.7 | 97.4 | 98.2 | 98.9 | 99.7 | 100.4 | 101.2 | 101.9 | 102.7 | 103.4 | .... | .... | .... | .... | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

## AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
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| | 43 | 112.5 | 113.2 | 113.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 112.4 | 113.2 | 113.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 112.4 | 113.1 | 113.8 | 114.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
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| | 42 | 111.8 | 112.5 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 111.7 | 112.5 | 113.2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
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| | 43 | 111.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 111.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 111.1 | 111.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
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| | 47 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
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| | 41 | 110.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
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| | 41 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 96.8 | 97.5 | 98.1 | 98.8 | 99.4 | 100.1 | 100.7 | 101.4 | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 96.7 | 97.4 | 98.1 | 98.7 | 99.4 | 100.0 | 100.7 | 101.4 | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 96.6 | 97.3 | 98.0 | 98.6 | 99.3 | 100.0 | 100.7 | 101.4 | 102.0 | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 96.5 | 97.2 | 97.9 | 98.6 | 99.3 | 99.9 | 100.6 | 101.3 | 102.0 | .... | .... | .... | .... | .... | .... | 46 | |
| 6-36 | 45 | 96.4 | 97.1 | 97.8 | 98.5 | 99.2 | 99.9 | 100.6 | 101.3 | 102.0 | .... | .... | .... | .... | .... | .... | 45 | 5-24 |
| | 44 | 96.3 | 97.0 | 97.7 | 98.4 | 99.2 | 99.9 | 100.6 | 101.3 | 102.0 | 102.7 | .... | .... | .... | .... | .... | 44 | |
| | 43 | 96.2 | 96.9 | 97.6 | 98.4 | 99.1 | 99.8 | 100.5 | 101.3 | 102.0 | 102.7 | .... | .... | .... | .... | .... | 43 | |
| | 42 | 96.1 | 96.8 | 97.5 | 98.3 | 99.0 | 99.8 | 100.5 | 101.2 | 102.0 | 102.7 | .... | .... | .... | .... | .... | 42 | |
| | 41 | 95.9 | 96.7 | 97.4 | 98.2 | 98.9 | 99.7 | 100.4 | 101.2 | 101.9 | 102.7 | 103.4 | .... | .... | .... | .... | 41 | |
| | 49 | 96.1 | 96.7 | 97.4 | 98.0 | 98.7 | 99.3 | 100.0 | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 96.0 | 96.6 | 97.3 | 98.0 | 98.6 | 99.3 | 100.0 | 100.6 | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 95.9 | 96.5 | 97.2 | 97.9 | 98.6 | 99.3 | 99.9 | 100.6 | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 95.8 | 96.5 | 97.2 | 97.8 | 98.5 | 99.2 | 99.9 | 100.6 | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-32 | 45 | 95.7 | 96.4 | 97.1 | 97.8 | 98.5 | 99.2 | 99.9 | 100.6 | .... | .... | .... | .... | .... | .... | .... | 45 | 5-28 |
| | 44 | 95.6 | 96.3 | 97.0 | 97.7 | 98.5 | 99.2 | 99.9 | 100.6 | 101.3 | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 95.5 | 96.2 | 96.9 | 97.7 | 98.4 | 99.1 | 99.9 | 100.6 | 101.3 | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 95.4 | 96.1 | 96.9 | 97.6 | 98.3 | 99.1 | 99.8 | 100.5 | 101.3 | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 95.3 | 96.0 | 96.8 | 97.5 | 98.3 | 99.0 | 99.8 | 100.5 | 101.3 | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 95.3 | 96.0 | 96.6 | 97.3 | 97.9 | 98.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 95.2 | 95.9 | 96.6 | 97.2 | 97.9 | 98.5 | 99.2 | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 95.1 | 95.8 | 96.5 | 97.2 | 97.9 | 98.5 | 99.2 | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 95.0 | 95.7 | 96.4 | 97.1 | 97.8 | 98.5 | 99.2 | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-28 | 45 | 95.0 | 95.7 | 96.4 | 97.1 | 97.8 | 98.5 | 99.2 | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 5-32 |
| | 44 | 94.9 | 95.6 | 96.3 | 97.0 | 97.8 | 98.5 | 99.2 | 99.9 | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 94.8 | 95.5 | 96.3 | 97.0 | 97.7 | 98.4 | 99.2 | 99.9 | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 94.7 | 95.4 | 96.2 | 96.9 | 97.7 | 98.4 | 99.1 | 99.9 | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 94.6 | 95.4 | 96.1 | 96.9 | 97.6 | 98.4 | 99.1 | 99.9 | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 94.5 | 95.2 | 95.8 | 96.5 | 97.2 | 97.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 94.5 | 95.1 | 95.8 | 96.5 | 97.1 | 97.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 94.4 | 95.1 | 95.8 | 96.4 | 97.1 | 97.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 94.3 | 95.0 | 95.7 | 96.4 | 97.1 | 97.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-24 | 45 | 94.3 | 95.0 | 95.7 | 96.4 | 97.1 | 97.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 5-36 |
| | 44 | 94.2 | 94.9 | 95.6 | 96.3 | 97.1 | 97.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 94.1 | 94.8 | 95.6 | 96.3 | 97.0 | 97.8 | 98.5 | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 94.0 | 94.8 | 95.5 | 96.3 | 97.0 | 97.7 | 98.5 | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 94.0 | 94.7 | 95.5 | 96.2 | 97.0 | 97.7 | 98.4 | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 93.8 | 94.4 | 95.1 | 95.7 | 96.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 93.7 | 94.4 | 95.1 | 95.7 | 96.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 93.7 | 94.4 | 95.0 | 95.7 | 96.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 93.6 | 94.3 | 95.0 | 95.7 | 96.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-20 | 45 | 93.5 | 94.3 | 95.0 | 95.7 | 96.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 5-40 |
| | 44 | 93.5 | 94.2 | 94.9 | 95.6 | 96.4 | 97.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 93.5 | 94.2 | 94.9 | 95.6 | 96.3 | 97.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 93.4 | 94.1 | 94.8 | 95.6 | 96.3 | 97.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 93.3 | 94.0 | 94.8 | 95.6 | 96.3 | 97.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 93.0 | 93.7 | 94.3 | 95.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 93.0 | 93.6 | 94.3 | 95.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 92.9 | 93.6 | 94.3 | 95.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 92.9 | 93.6 | 94.3 | 95.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-16 | 45 | 92.8 | 93.5 | 94.2 | 94.9 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 5-44 |
| | 44 | 92.8 | 93.5 | 94.2 | 94.9 | 95.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 92.7 | 93.5 | 94.2 | 94.9 | 95.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 92.7 | 93.4 | 94.2 | 94.9 | 95.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 92.6 | 93.4 | 94.1 | 94.9 | 95.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 92.3 | 92.9 | 93.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 92.2 | 92.9 | 93.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 92.2 | 92.9 | 93.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 92.2 | 92.9 | 93.6 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-12 | 45 | 92.1 | 92.8 | 93.5 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 5-48 |
| | 44 | 92.1 | 92.8 | 93.5 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 92.1 | 92.8 | 93.5 | 94.3 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 92.0 | 92.8 | 93.5 | 94.2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 92.0 | 92.7 | 93.5 | 94.2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 91.5 | 92.2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 91.5 | 92.2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 91.5 | 92.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 91.4 | 92.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-08 | 45 | 91.4 | 92.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 5-52 |
| | 44 | 91.4 | 92.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 91.4 | 92.1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 91.3 | 92.1 | 92.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 91.3 | 92.1 | 92.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 90.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-04 | 45 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 5-56 |
| | 44 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 90.7 | 91.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AZIMUT OR TRUE BEARING.

| Time A. M. | Latitude | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Latitude | Time P. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H. M. | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | H. M. |
| | | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | | |
| | 49 | 90.8 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-04 | 45 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 5-56 |
| | 44 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 90.7 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 90.7 | 91.4 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | 49 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 49 | |
| | 48 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 48 | |
| | 47 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 47 | |
| | 46 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 46 | |
| 6-00 | 45 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 45 | 6-00 |
| | 44 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 44 | |
| | 43 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 43 | |
| | 42 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 42 | |
| | 41 | 90.0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 41 | |
| | ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° | |

# AUXILIARY TABLES.

## TABLE A—TRUE AZIMUT AT RISING AND SETTING.

| Lat. | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Lat. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° |
| | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | |
| 49 | 90.0 | 88.5 | 87.0 | 85.4 | 83.9 | 82.4 | 80.8 | 79.3 | 77.8 | 76.2 | 74.7 | 73.1 | 71.5 | 70.0 | 68.4 | 49 |
| 48 | 90.0 | 88.5 | 87.0 | 85.5 | 84.0 | 82.5 | 81.0 | 79.5 | 78.0 | 76.5 | 75.0 | 73.4 | 71.9 | 70.4 | 68.8 | 48 |
| 47 | 90.0 | 88.6 | 87.1 | 85.6 | 84.2 | 82.7 | 81.2 | 79.7 | 78.2 | 76.7 | 75.3 | 73.8 | 72.3 | 70.7 | 69.2 | 47 |
| 46 | 90.0 | 88.6 | 87.1 | 85.7 | 84.2 | 82.8 | 81.4 | 79.9 | 78.5 | 77.0 | 75.5 | 74.1 | 72.6 | 71.1 | 69.6 | 46 |
| 45 | 90.0 | 88.6 | 87.2 | 85.8 | 84.3 | 82.9 | 81.5 | 80.1 | 78.7 | 77.2 | 75.8 | 74.4 | 72.9 | 71.5 | 70.0 | 45 |
| 44 | 90.0 | 88.6 | 87.2 | 85.8 | 84.4 | 83.0 | 81.7 | 80.3 | 78.9 | 77.4 | 76.0 | 74.6 | 73.2 | 71.8 | 70.4 | 44 |
| 43 | 90.0 | 88.6 | 87.3 | 85.9 | 84.5 | 83.2 | 81.8 | 80.4 | 79.0 | 77.7 | 76.3 | 74.9 | 73.5 | 72.1 | 70.7 | 43 |
| 42 | 90.0 | 88.7 | 87.3 | 86.0 | 84.6 | 83.3 | 81.9 | 80.6 | 79.2 | 77.9 | 76.5 | 75.1 | 73.8 | 72.4 | 71.0 | 42 |
| 41 | 90.0 | 88.7 | 87.4 | 86.0 | 84.7 | 83.4 | 82.1 | 80.7 | 79.4 | 78.0 | 76.7 | 75.4 | 74.0 | 72.7 | 71.3 | 41 |

## TABLE B—TRUE AZIMUT AT RISING AND SETTING.

| Lat. | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Lat. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° |
| | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | |
| 49 | 90.0 | 91.5 | 93.0 | 94.6 | 96.1 | 97.6 | 99.2 | 100.7 | 102.2 | 103.8 | 105.3 | 106.9 | 108.5 | 110.0 | 111.6 | 49 |
| 48 | 90.0 | 91.5 | 93.0 | 94.5 | 96.0 | 97.5 | 99.0 | 100.5 | 102.0 | 103.5 | 105.0 | 106.6 | 108.1 | 109.6 | 111.2 | 48 |
| 47 | 90.0 | 91.4 | 92.9 | 94.4 | 95.9 | 97.3 | 98.8 | 100.3 | 101.8 | 103.3 | 104.7 | 106.2 | 107.7 | 109.3 | 110.8 | 47 |
| 46 | 90.0 | 91.4 | 92.9 | 94.3 | 95.8 | 97.2 | 98.7 | 100.1 | 101.5 | 103.0 | 104.5 | 105.9 | 107.4 | 108.9 | 110.4 | 46 |
| 45 | 90.0 | 91.4 | 92.8 | 94.2 | 95.7 | 97.1 | 98.5 | 99.9 | 101.3 | 102.8 | 104.2 | 105.6 | 107.1 | 108.5 | 110.0 | 45 |
| 44 | 90.0 | 91.4 | 92.8 | 94.2 | 95.6 | 97.0 | 98.3 | 99.7 | 101.1 | 102.6 | 104.0 | 105.4 | 106.8 | 108.2 | 109.6 | 44 |
| 43 | 90.0 | 91.4 | 92.7 | 94.1 | 95.5 | 96.8 | 98.2 | 99.6 | 101.0 | 102.3 | 103.7 | 105.1 | 106.5 | 107.9 | 109.3 | 43 |
| 42 | 90.0 | 91.3 | 92.7 | 94.0 | 95.4 | 96.7 | 98.1 | 99.4 | 100.8 | 102.1 | 103.5 | 104.9 | 106.2 | 107.6 | 109.0 | 42 |
| 41 | 90.0 | 91.3 | 92.6 | 94.0 | 95.3 | 96.6 | 98.0 | 99.3 | 100.6 | 102.0 | 103.3 | 104.6 | 106.0 | 107.3 | 108.7 | 41 |

## TABLE C—APPARENT TIME OF { RISING, DECLINATION—SAME AS—LATITUDE. / SETTING, DECLINATION—OPPOSITE TO—LATITUDE.

| Lat. | DECLINATION. | | | | | | | | | | | | | | | Lat. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° |
| | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | |
| 49 | 6 00 | 5 55 | 5 51 | 5 46 | 5 42 | 5 37 | 5 32 | 5 28 | 5 23 | 5 18 | 5 13 | 5 08 | 5 03 | 4 58 | 4 53 | 49 |
| 48 | 6 00 | 5 56 | 5 51 | 5 47 | 5 42 | 5 38 | 5 33 | 5 29 | 5 24 | 5 19 | 5 15 | 5 10 | 5 05 | 5 01 | 4 56 | 48 |
| 47 | 6 00 | 5 56 | 5 51 | 5 47 | 5 43 | 5 38 | 5 34 | 5 30 | 5 25 | 5 21 | 5 16 | 5 12 | 5 07 | 5 03 | 4 58 | 47 |
| 46 | 6 00 | 5 56 | 5 52 | 5 48 | 5 43 | 5 39 | 5 35 | 5 31 | 5 27 | 5 22 | 5 18 | 5 14 | 5 09 | 5 05 | 5 00 | 46 |
| 45 | 6 00 | 5 56 | 5 52 | 5 48 | 5 44 | 5 40 | 5 36 | 5 32 | 5 28 | 5 24 | 5 19 | 5 15 | 5 11 | 5 07 | 5 02 | 45 |
| 44 | 6 00 | 5 56 | 5 52 | 5 48 | 5 45 | 5 41 | 5 37 | 5 33 | 5 29 | 5 25 | 5 21 | 5 17 | 5 13 | 5 08 | 5 04 | 44 |
| 43 | 6 00 | 5 56 | 5 53 | 5 49 | 5 45 | 5 41 | 5 38 | 5 34 | 5 30 | 5 26 | 5 22 | 5 18 | 5 14 | 5 10 | 5 06 | 43 |
| 42 | 6 00 | 5 56 | 5 53 | 5 49 | 5 46 | 5 42 | 5 38 | 5 35 | 5 31 | 5 27 | 5 23 | 5 20 | 5 16 | 5 12 | 5 08 | 42 |
| 41 | 6 00 | 5 57 | 5 53 | 5 50 | 5 46 | 5 43 | 5 39 | 5 35 | 5 32 | 5 28 | 5 25 | 5 21 | 5 17 | 5 14 | 5 10 | 41 |

## TABLE D—APPARENT TIME OF { SETTING, DECLINATION—SAME AS—LATITUDE. / RISING, DECLINATION—OPPOSITE TO—LATITUDE.

| Lat. | DECLINATION. | | | | | | | | | | | | | | | Lat. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | 0° | 1° | 2° | 3° | 4° | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | ° |
| | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | |
| 49 | 6 00 | 6 05 | 6 09 | 6 14 | 6 18 | 6 23 | 6 28 | 6 32 | 6 37 | 6 42 | 6 47 | 6 52 | 6 57 | 7 02 | 7 07 | 49 |
| 48 | 6 00 | 6 04 | 6 09 | 6 13 | 6 18 | 6 22 | 6 27 | 6 31 | 6 36 | 6 41 | 6 45 | 6 50 | 6 55 | 6 59 | 7.04 | 48 |
| 47 | 6 00 | 6 04 | 6 09 | 6 13 | 6 17 | 6 22 | 6 26 | 6 30 | 6 35 | 6 39 | 6 44 | 5 48 | 6 53 | 6 57 | 7 02 | 47 |
| 46 | 6 00 | 6 04 | 6 08 | 6 12 | 6 17 | 6 21 | 6 25 | 6 29 | 6 33 | 6 38 | 6 42 | 6 46 | 6 51 | 6 55 | 7 00 | 46 |
| 45 | 6 00 | 6 04 | 6 08 | 6 12 | 6 16 | 6 20 | 6 24 | 6 28 | 6 32 | 6 36 | 6 41 | 6 45 | 6 49 | 6 53 | 6 58 | 45 |
| 44 | 6 00 | 6 04 | 6 08 | 6 12 | 6 15 | 6 19 | 6 23 | 6 27 | 6 31 | 6 35 | 6 39 | 6 43 | 6 47 | 6 52 | 6 56 | 44 |
| 43 | 6 00 | 6 04 | 6 07 | 6 11 | 6 15 | 6 19 | 6 22 | 6 26 | 6 30 | 6 34 | 6 38 | 6 42 | 6 46 | 6 50 | 6 54 | 43 |
| 42 | 6 00 | 6 04 | 6 07 | 6 11 | 6 14 | 6 18 | 6 22 | 6 25 | 6 29 | 6 33 | 6 37 | 6 40 | 6 44 | 6 48 | 6 52 | 42 |
| 41 | 6 00 | 6 03 | 6 07 | 6 10 | 6 14 | 6 17 | 6 21 | 6 25 | 6 28 | 6 32 | 6 35 | 6 39 | 6 43 | 6 46 | 6 50 | 41 |

## TABLE A—TRUE AZIMUT AT RISING AND SETTING.

| Lat. | DECLINATION—SAME AS—LATITUDE. | | | | | | | | | | | | | | | Lat. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° |
| | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | |
| 49 | 66.8 | 65.2 | 63.5 | 61.9 | 60.3 | 58.6 | 56.9 | 55.2 | 53.5 | 51.7 | 49.9 | 48.1 | 46.2 | 44.3 | 42.4 | 49 |
| 48 | 67.3 | 65.7 | 64.1 | 62.5 | 60.9 | 59.3 | 57.6 | 56.0 | 54.3 | 52.6 | 50.8 | 49.1 | 47.3 | 45.4 | 43.6 | 48 |
| 47 | 67.7 | 66.2 | 64.6 | 63.1 | 61.5 | 59.9 | 58.3 | 56.7 | 55.1 | 53.4 | 51.7 | 50.0 | 48.3 | 46.5 | 44.7 | 47 |
| 46 | 68.1 | 66.6 | 65.1 | 63.6 | 62.1 | 60.5 | 59.0 | 57.4 | 55.8 | 54.2 | 52.5 | 50.9 | 49.2 | 47.5 | 45.7 | 46 |
| 45 | 68.5 | 67.1 | 65.6 | 64.1 | 62.6 | 61.1 | 59.6 | 58.0 | 56.5 | 54.9 | 53.3 | 51.7 | 50.1 | 48.4 | 46.7 | 45 |
| 44 | 68.9 | 67.5 | 66.0 | 64.6 | 63.1 | 61.6 | 60.1 | 58.6 | 57.1 | 55.6 | 54.0 | 52.5 | 50.9 | 49.3 | 47.6 | 44 |
| 43 | 69.3 | 67.9 | 66.4 | 65.0 | 63.6 | 62.1 | 60.7 | 59.2 | 57.7 | 56.2 | 54.7 | 53.2 | 51.6 | 50.1 | 48.5 | 43 |
| 42 | 69.6 | 68.2 | 66.8 | 65.4 | 64.0 | 62.6 | 61.2 | 59.7 | 58.3 | 56.8 | 55.3 | 53.9 | 52.3 | 50.8 | 49.3 | 42 |
| 41 | 70.0 | 68.6 | 67.2 | 65.8 | 64.5 | 63.1 | 61.7 | 60.2 | 58.8 | 57.4 | 55.9 | 54.5 | 53.0 | 51.5 | 50.0 | 41 |

## TABLE B—TRUE AZIMUT AT RISING AND SETTING.

| Lat. | DECLINATION—OPPOSITE TO—LATITUDE. | | | | | | | | | | | | | | | Lat. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° |
| | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | |
| 49 | 113.2 | 114.8 | 116.5 | 118.1 | 119.7 | 121.4 | 123.1 | 124.8 | 126.5 | 128.3 | 130.1 | 131.9 | 133.8 | 135.7 | 137.6 | 49 |
| 48 | 112.7 | 114.3 | 115.9 | 117.5 | 119.1 | 120.7 | 122.4 | 124.0 | 125.7 | 127.4 | 129.2 | 130.9 | 132.7 | 134.6 | 136.4 | 48 |
| 47 | 112.3 | 113.8 | 115.4 | 116.9 | 118.5 | 120.1 | 121.7 | 123.3 | 124.9 | 126.6 | 128.3 | 130.0 | 131.7 | 133.5 | 135.3 | 47 |
| 46 | 111.9 | 113.4 | 114.9 | 116.4 | 117.9 | 119.5 | 121.0 | 122.6 | 124.2 | 125.8 | 127.5 | 129.1 | 130.8 | 132.5 | 134.3 | 46 |
| 45 | 111.5 | 112.9 | 114.4 | 115.9 | 117.4 | 118.9 | 120.4 | 122.0 | 123.5 | 125.1 | 126.7 | 128.3 | 129.9 | 131.6 | 133.3 | 45 |
| 44 | 111.1 | 112.5 | 114.0 | 115.4 | 116.9 | 118.4 | 119.9 | 121.4 | 122.9 | 124.4 | 126.0 | 127.5 | 129.1 | 130.7 | 132.4 | 44 |
| 43 | 110.7 | 112.1 | 113.6 | 115.0 | 116.4 | 117.9 | 119.3 | 120.8 | 122.3 | 123.8 | 125.3 | 126.8 | 128.4 | 129.9 | 131.5 | 43 |
| 42 | 110.4 | 111.8 | 113.2 | 114.6 | 116.0 | 117.4 | 118.8 | 120.3 | 121.7 | 123.2 | 124.7 | 126.1 | 127.7 | 129.2 | 130.7 | 42 |
| 41 | 110.0 | 111.4 | 112.8 | 114.2 | 115.5 | 116.9 | 118.3 | 119.8 | 121.2 | 122.6 | 124.1 | 125.5 | 127.0 | 128.5 | 130.0 | 41 |

## TABLE C—APPARENT TIME OF { RISING, DECLINATION—SAME AS—LATITUDE. / SETTING, DECLINATION—OPPOSITE TO—LATITUDE.

| Lat. | DECLINATION. | | | | | | | | | | | | | | | Lat. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° |
| | H.M | H.M. | H.M. | H.M. | H.M. | H.M. | H M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | H.M. | |
| 49 | 4 48 | 4 43 | 4 38 | 4 32 | 4 27 | 4 21 | 4 15 | 4 09 | 4 03 | 3 57 | 3 50 | 3 43 | 3 36 | 3 29 | 3 22 | 49 |
| 48 | 4 51 | 4 46 | 4 41 | 4 35 | 4 30 | 4 25 | 4 19 | 4 13 | 4 07 | 4 01 | 3 55 | 3 49 | 3 42 | 3 35 | 3 28 | 48 |
| 47 | 4 53 | 4 48 | 4 43 | 4 38 | 4 33 | 4 28 | 4 23 | 4 17 | 4 12 | 4 06 | 4 00 | 3 54 | 3 48 | 3 41 | 3 34 | 47 |
| 46 | 4 56 | 4 51 | 4 46 | 4 41 | 4 36 | 4 31 | 4 26 | 4 21 | 4 16 | 4 10 | 4 05 | 3 59 | 3 53 | 3 46 | 3 40 | 46 |
| 45 | 4 58 | 4 53 | 4 49 | 4 44 | 4 39 | 4 35 | 4 30 | 4 25 | 4 20 | 4 14 | 4 09 | 4 03 | 3 57 | 3 52 | 3 45 | 45 |
| 44 | 5 00 | 4 56 | 4 51 | 4 47 | 4 42 | 4 38 | 4 33 | 4 28 | 4 23 | 4 18 | 4 13 | 4 08 | 4 02 | 3 56 | 3 51 | 44 |
| 43 | 5 02 | 4 58 | 4 54 | 4 49 | 4 45 | 4 41 | 4 36 | 4 31 | 4 27 | 4 22 | 4 17 | 4 12 | 4 07 | 4 01 | 3 56 | 43 |
| 42 | 5 04 | 5 00 | 4 56 | 4 52 | 4 48 | 4 43 | 4 39 | 4 35 | 4 30 | 4 25 | 4 21 | 4 16 | 4 11 | 4 05 | 4 00 | 42 |
| 41 | 5 06 | 5 02 | 4 58 | 4 54 | 4 50 | 4 46 | 4 42 | 4 38 | 4 33 | 4.29 | 4 24 | 4 20 | 4 15 | 4 10 | 4 05 | 41 |

## TABLE D—APPARENT TIME OF { SETTING, DECLINATION—SAME AS—LATITUDE. / RISING, DECLINATION—OPPOSITE TO—LATITUDE.

| Lat. | DECLINATION. | | | | | | | | | | | | | | | Lat. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | 15° | 16° | 17° | 18° | 19° | 20° | 21° | 22° | 23° | 24° | 25° | 26° | 27° | 28° | 29° | ° |
| | H M. | H.M. | H.M. | H M. | H M. | H.M. | H.M. | H M. | H M | H.M. | H M. | H.M. | H M. | H.M. | H M. | |
| 49 | 7 12 | 7 17 | 7 22 | 7 28 | 7 33 | 7 39 | 7 45 | 7 51 | 7 57 | 8 03 | 8 10 | 8 17 | 8 24 | 8 31 | 8 38 | 49 |
| 48 | 7 09 | 7 14 | 7 19 | 7 25 | 7 30 | 7 35 | 7 41 | 7 47 | 7 53 | 7 59 | 8 05 | 8 11 | 8 18 | 8 25 | 8 32 | 48 |
| 47 | 7 07 | 7 12 | 7 17 | 7 22 | 7 27 | 7 32 | 7 37 | 7 43 | 7 48 | 7 54 | 8 00 | 8 06 | 8 12 | 8 19 | 8 26 | 47 |
| 46 | 7 04 | 7 09 | 7 14 | 7 19 | 7 24 | 7 29 | 7 34 | 7 39 | 7 44 | 7 50 | 7 55 | 8 01 | 8 07 | 8 14 | 8 20 | 46 |
| 45 | 7 02 | 7 07 | 7 11 | 7 16 | 7 21 | 7 25 | 7 30 | 7 35 | 7 40 | 7 46 | 7 51 | 7 57 | 8 03 | 8 08 | 8 15 | 45 |
| 44 | 7 00 | 7 04 | 7 09 | 7 13 | 7 18 | 7 22 | 7 27 | 7 32 | 7 37 | 7 42 | 7 47 | 7 52 | 7 58 | 8 04 | 8 09 | 44 |
| 43 | 6 58 | 7 02 | 7 06 | 7 11 | 7 15 | 7 19 | 7 24 | 7 29 | 7 33 | 7 38 | 7 43 | 7 48 | 7 53 | 7 59 | 8 04 | 43 |
| 42 | 6 56 | 7 00 | 7 04 | 7 08 | 7 12 | 7 17 | 7 21 | 7 25 | 7 30 | 7 35 | 7 39 | 7 44 | 7 49 | 7 55 | 8 00 | 42 |
| 41 | 6 54 | 6 58 | 7 02 | 7 06 | 7 10 | 7 14 | 7 18 | 7 22 | 7 27 | 7 31 | 7 36 | 7 40 | 7 45 | 7 50 | 7 55 | 41 |

## TABLE E

### CONTAINING THE APPROXIMATE DECLINATIONS OF THE SUN FOR EVERY DAY.

| Day | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | |
| 1 | 23.1S | 17.3S | 7.8S | 4.3N | 14.9N | 22.0N | 23.2N | 18.2N | 8.5N | 3.0S | 14.3S | 21.7S | 1 |
| 2 | 23.0S | 17.0S | 7.4S | 4.7N | 15.2N | 22.1N | 23.1N | 18.0N | 8.1N | 3.4S | 14.6S | 21.9S | 2 |
| 3 | 22.9S | 16.7S | 7.0S | 5.1N | 15.5N | 22.3N | 23.0N | 17.7N | 7.8N | 3.8S | 14.9S | 22.0S | 3 |
| 4 | 22.8S | 16.4S | 6.6S | 5.5N | 15.8N | 22.4N | 22.9N | 17.4N | 7.4N | 4.1S | 15.2S | 22.2S | 4 |
| 5 | 22.7S | 16.1S | 6.3S | 5.9N | 16.1N | 22.5N | 22.8N | 17.1N | 7.0N | 4.5S | 15.6S | 22.3S | 5 |
| 6 | 22.6S | 15.9S | 5.9S | 6.3N | 16.4N | 22.6N | 22.8N | 16.9N | 6.7N | 4.9S | 15.8S | 22.4S | 6 |
| 7 | 22.5S | 15.5S | 5.5S | 6.6N | 16.7N | 22.7N | 22.7N | 16.6N | 6.3N | 5.3S | 16.1S | 22.6S | 7 |
| 8 | 22.4S | 15.2S | 5.1S | 7.0N | 17.0N | 22.8N | 22.5N | 16.3N | 5.9N | 5.7S | 16.4S | 22.7S | 8 |
| 9 | 22.2S | 14.9S | 4.7S | 7.4N | 17.2N | 22.9N | 22.4N | 16.0N | 5.5N | 6.1S | 16.7S | 22.7S | 9 |
| 10 | 22.1S | 14.6S | 4.3S | 7.8N | 17.5N | 23.0N | 22.3N | 15.7N | 5.2N | 6.4S | 17.0S | 22.9S | 10 |
| 11 | 21.9S | 14.3S | 3.9S | 8.1N | 17.7N | 23.1N | 22.2N | 15.4N | 4.8N | 6.8S | 17.3S | 23.0S | 11 |
| 12 | 21.8S | 13.9S | 3.5S | 8.5N | 18.0N | 23.1N | 22.1N | 15.2N | 4.4N | 7.2S | 17.6S | 23.1S | 12 |
| 13 | 21.6S | 13.6S | 3.1S | 8.9N | 18.3N | 23.2N | 21.9N | 14.9N | 4.0N | 7.6S | 17.8S | 23.1S | 13 |
| 14 | 21.4S | 13.3S | 2.7S | 9.3N | 18.5N | 23.2N | 21.8N | 14.5N | 3.6N | 7.9S | 18.1S | 23.2S | 14 |
| 15 | 21.3S | 12.9S | 2.3S | 9.6N | 18.7N | 23.3N | 21.6N | 14.2N | 3.2N | 8.3S | 18.4S | 23.2S | 15 |
| 16 | 21.1S | 12.6S | 2.0S | 9.9N | 19.0N | 23.3N | 21.5N | 13.9N | 2.8N | 8.7S | 18.6S | 23.3S | 16 |
| 17 | 20.9S | 12.2S | 1.6S | 10.3N | 19.2N | 23.4N | 21.3N | 13.6N | 2.5N | 9.1S | 18.9S | 23.3S | 17 |
| 18 | 20.7S | 11.9S | 1.2S | 10.6N | 19.4N | 23.4N | 21.1N | 13.3N | 2.1N | 9.4S | 19.1S | 23.4S | 18 |
| 19 | 20.5S | 11.5S | 0.8S | 11.0N | 19.7N | 23.4N | 21.0N | 13.0N | 1.7N | 9.8S | 19.3S | 23.4S | 19 |
| 20 | 20.3S | 11.2S | 0.4S | 11.3N | 19.9N | 23.4N | 20.8N | 12.6N | 1.3N | 10.2S | 19.6S | 23.4S | 20 |
| 21 | 20.1S | 108.S | 0.0 | 11.7N | 20.1N | 23.5N | 20.6N | 12.3N | 0.9N | 10.5S | 19.8S | 23.4S | 21 |
| 22 | 19.9S | 10.5S | 0.4N | 12.0N | 20.3N | 23.5N | 20.4N | 12.0N | 0.5N | 10.9S | 20.0S | 23.5S | 22 |
| 23 | 19.6S | 10.1S | 0.8N | 12.4N | 20.5N | 23.4N | 20.2N | 11.6N | 0.1N | 11.2S | 20.2S | 23.5S | 23 |
| 24 | 19.4S | 9.7S | 1.2N | 12.7N | 20.7N | 23.4N | 20.0N | 11.3N | 0.3S | 11.6S | 20.5S | 23.4S | 24 |
| 25 | 19.1S | 9.4S | 1.6N | 13.0N | 20.9N | 23.4N | 19.8N | 11.0N | 0.6S | 11.9S | 20.7S | 23.4S | 25 |
| 26 | 18.9S | 9.0S | 2.0N | 13.3N | 21.0N | 23.4N | 19.6N | 10.6N | 1.0S | 12.3S | 20.9S | 23.4S | 26 |
| 27 | 18.7S | 8.6S | 2.4N | 13.7N | 21.2N | 23.4N | 19.4N | 10.3N | 1.4S | 12.6S | 21.1S | 23.4S | 27 |
| 28 | 18.4S | 8.3S | 2.8N | 14.0N | 21.4N | 23.3N | 19.1N | 9.9N | 1.8S | 12.9S | 21.2S | 23.3S | 28 |
| 29 | 18.1S | 8.0S | 3.2N | 14.3N | 21.5N | 23.3N | 18.9N | 9.6N | 2.2S | 13.3S | 21.4S | 23.3S | 29 |
| 30 | 17.9S | | 3.6N | 14.6N | 21.7N | 23.2N | 18.7N | 9.2N | 2.6S | 13.6S | 21.6S | 23.2S | 30 |
| 31 | 17.6S | | 4.0N | | 21.8N | | 18.4N | 8.9N | | 13.9S | | 23.1S | 31 |

## TABLE F

### CONTAINING THE APPROXIMATE EQUATION OF TIME FOR EVERY DAY.

| Day | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | M | M | M | M | M | M | M | M | M | M | M | |
| 1 | − 3.3 | −13.7 | −12.6 | − 4.1 | + 2.9 | + 2.5 | − 3.4 | − 6.2 | − 0.1 | +10.1 | +16.3 | +11.1 | 1 |
| 2 | − 3.8 | −13.8 | −12.4 | − 3.8 | + 3.0 | + 2.4 | − 3.6 | − 6.1 | + 0.2 | +10.4 | +16.3 | +10.7 | 2 |
| 3 | − 4.2 | −13.9 | −12.2 | − 3.5 | + 3.2 | + 2.2 | − 3.8 | − 6.1 | + 0.5 | +10.8 | +16.3 | +10.3 | 3 |
| 4 | − 4.7 | −14.0 | −12.0 | − 3.2 | + 3.3 | + 2.1 | − 4.0 | − 6.0 | + 0.8 | +11.1 | +16.3 | +10.0 | 4 |
| 5 | − 5.2 | −14.1 | −11.8 | − 2.9 | + 3.4 | + 1.9 | − 4.2 | − 5.9 | + 1.2 | +11.4 | +16.3 | + 9.5 | 5 |
| 6 | − 5.6 | −14.2 | −11.6 | − 2.6 | + 3.5 | + 1.7 | − 4.4 | − 5.8 | + 1.5 | +11.7 | +16.3 | + 9.1 | 6 |
| 7 | − 6.1 | −14.3 | −11.3 | − 2.4 | + 3.5 | + 1.5 | − 4.5 | − 5.7 | + 1.8 | +12.0 | +16.3 | + 8.7 | 7 |
| 8 | − 6.5 | −14.3 | −11.1 | − 2.1 | + 3.6 | + 1.4 | − 4.7 | − 5.6 | + 2.2 | +12.3 | +16.2 | + 8.3 | 8 |
| 9 | − 6.8 | −14.4 | −10.8 | − 1.8 | + 3.7 | + 1.2 | − 4.8 | − 5.4 | + 2.5 | +12.5 | +16.2 | + 7.8 | 9 |
| 10 | − 7.3 | −14.4 | −10.6 | − 1.5 | + 3.7 | + 1.0 | − 5.0 | − 5.3 | + 2.8 | +12.8 | +16.1 | + 7.4 | 10 |
| 11 | − 7.7 | −14.4 | −10.3 | − 1.2 | + 3.8 | + 0.8 | − 5.1 | − 5.1 | + 3.2 | +13.1 | +16.0 | + 6.9 | 11 |
| 12 | − 8.1 | −14.4 | −10.1 | − 1.0 | + 3.8 | + 0.6 | − 5.3 | − 5.0 | + 3.5 | +13.3 | +15.9 | + 6.5 | 12 |
| 13 | − 8.5 | −14.4 | − 9.8 | − 0.7 | + 3.8 | + 0.4 | − 5.4 | − 4.8 | + 3.9 | +13.6 | +15.7 | + 6.0 | 13 |
| 14 | − 8.9 | −14.4 | − 9.5 | − 0.4 | + 3.8 | + 0.2 | − 5.5 | − 4.6 | + 4.2 | +13.8 | +15.6 | + 5.5 | 14 |
| 15 | − 9.3 | −14.4 | − 9.2 | − 0.1 | + 3.8 | 0 0 | − 5.6 | − 4.5 | + 4.6 | +14.0 | +15.4 | + 5.0 | 15 |
| 16 | − 9.6 | −14.3 | − 9.0 | + 0.1 | + 3.8 | − 0.3 | − 5.7 | − 4.3 | + 4.9 | +14.3 | +15.3 | + 4.5 | 16 |
| 17 | −10.0 | −14.3 | − 8.7 | + 0.3 | + 3.8 | − 0.5 | − 5.8 | − 4.1 | + 5.3 | +14.5 | +15.1 | + 4.1 | 17 |
| 18 | −10.3 | −14.2 | − 8.4 | + 0.5 | + 3.8 | − 0.7 | − 5.9 | − 3.9 | + 5.6 | +14.7 | +14.9 | + 3.6 | 18 |
| 19 | −10.6 | −14.1 | − 8.1 | + 0.8 | + 3.8 | − 0.9 | − 6.0 | − 3.6 | + 6.0 | +14.8 | +14.6 | + 3.1 | 19 |
| 20 | −10.9 | −14.0 | − 7.8 | + 1.0 | + 3.7 | − 1.1 | − 6.1 | − 3.4 | + 6.4 | +15.0 | +14.4 | + 2.6 | 20 |
| 21 | −11.2 | −13.9 | − 7.5 | + 1.2 | + 3.7 | − 1.3 | − 6.1 | − 3.2 | + 6.7 | +15.2 | +14.2 | + 2.1 | 21 |
| 22 | −11.5 | −13.8 | − 7.2 | + 1.4 | + 3.6 | − 1.6 | − 6.2 | − 2.9 | + 7.1 | +15.3 | +13.9 | + 1.6 | 22 |
| 23 | −11.8 | −13.7 | − 6.9 | + 1.6 | + 3.5 | − 1.8 | − 6.2 | − 2.7 | + 7.4 | +15.5 | +13.7 | + 1.1 | 23 |
| 24 | −12.1 | −13.5 | − 6.6 | + 1.8 | + 3.4 | − 2.0 | − 6.3 | − 2.4 | + 7.8 | +15.6 | +13.4 | + 0.6 | 24 |
| 25 | −12.3 | −13.4 | − 6.3 | + 2.0 | + 3.4 | − 2.2 | − 6.3 | − 2.2 | + 8.1 | +15.8 | +13.1 | + 0.1 | 25 |
| 26 | −12.6 | −13.2 | − 6.0 | + 2.2 | + 3.3 | − 2.4 | − 6.3 | − 1.9 | + 8.5 | +15.9 | +12.8 | − 0.4 | 26 |
| 27 | −12.8 | −13.1 | − 5.7 | + 2.3 | + 3.2 | − 2.6 | − 6.3 | − 1.6 | + 8.8 | +16.0 | +12.5 | − 0.9 | 27 |
| 28 | −13.0 | −12.9 | − 5.4 | + 2.5 | + 3.1 | − 2.8 | − 6.3 | − 1.3 | + 9.1 | +16.1 | +12.2 | − 1.4 | 28 |
| 29 | −13.2 | −12.7 | − 5.1 | + 2.6 | + 2.9 | − 3.0 | − 6.3 | − 1.0 | + 9.5 | +16.2 | +11.8 | − 1.9 | 29 |
| 30 | −13.3 | | − 4.7 | + 2.8 | + 2.8 | − 3.2 | − 6.3 | − 0.7 | + 9.8 | +16.2 | +11.5 | − 2.4 | 30 |
| 31 | −13.5 | | − 4.4 | | + 2.7 | | − 6.2 | − 0.4 | | +16.3 | | − 2.9 | 31 |

## TABLE G—AZIMUT OF POLARIS.

| LOCAL SIDEREAL TIME | | LATITUDE | | | |
|---|---|---|---|---|---|
| | | ° 40 | ° 45 | ° 50 | |
| HOUR | | ° | ° | ° | |
| 0 | North | 0.6 | 0.6 | 0.7 | East |
| 1 | " | 0.3 | 0.3 | 0.3 | " |
| | | ° | ° | ° | |
| 2 | North | 0.1 | 0.1 | 0.1 | West |
| 3 | " | 0.4 | 0.5 | 0.5 | " |
| 4 | " | 0.7 | 0.8 | 0.9 | " |
| 5 | " | 1.0 | 1.1 | 1.2 | " |
| 6 | " | 1.2 | 1.3 | 1.4 | " |
| 7 | " | 1.3 | 1.4 | 1.6 | " |
| 8 | " | 1.3 | 1.4 | 1.6 | " |
| 9 | " | 1.2 | 1.3 | 1.5 | " |
| 10 | " | 1.1 | 1.2 | 1.3 | " |
| 11 | " | 0.9 | 0.9 | 1.0 | " |
| 12 | " | 0.6 | 0.6 | 0.7 | " |
| 13 | " | 0.3 | 0.3 | 0.3 | " |
| | | ° | ° | ° | |
| 14 | North | 0 1 | 0.1 | 0.1 | East |
| 15 | " | 0.4 | 0.5 | 0.5 | " |
| 16 | " | 0.7 | 0.8 | 0.9 | " |
| 17 | " | 1.0 | 1.1 | 1.2 | " |
| 18 | " | 1.2 | 1.3 | 1.4 | " |
| 19 | " | 1.3 | 1.4 | 1.5 | " |
| 20 | " | 1.3 | 1.4 | 1.6 | " |
| 21 | " | 1.3 | 1.4 | 1.5 | " |
| 22 | " | 1.1 | 1.2 | 1.3 | " |
| 23 | " | 0.9 | 1.0 | 1.1 | " |
| 24 | " | 0.6 | 0.6 | 0.7 | " |

## TABLE H

### FOR CONVERTING DEGREES INTO COMPASS DIVISIONS AND VICE VERSA.

| | ° | | | ° | |
|---|---|---|---|---|---|
| North | 0.0 | North | East | 90.0 | West |
| N⅙E | 1.4 | N⅙W | E⅙S | 91.4 | W⅙S |
| N¼E | 2.8 | N¼W | E¼S | 92.8 | W¼S |
| N⅜E | 4.2 | N⅜W | E⅜S | 94.2 | W⅜S |
| N½E | 5.6 | N½W | E½S | 95.6 | W½S |
| N⅝E | 7.0 | N⅝W | E⅝S | 97.0 | W⅝S |
| N¾E | 8.4 | N¾W | E¾S | 98.4 | W¾S |
| N⅞E | 9.8 | N⅞W | E⅞S | 99.8 | W⅞S |
| NxE | 11.3 | NxW | ExS | 101.3 | WxS |
| NxE⅛E | 12.7 | NxW⅛W | ExS⅛S | 102.7 | WxS⅛S |
| NxE¼E | 14.1 | NxW¼W | ExS¼S | 104.1 | WxS¼S |
| NxE⅜E | 15.5 | NxW⅜W | ExS⅜S | 105.5 | WxS⅜S |
| NxE½E | 16.9 | NxW½W | ExS½S | 106.9 | WxS½S |
| NxE⅝E | 18.3 | NxW⅝W | ExS⅝S | 108.3 | WxS⅝S |
| NxE¾E | 19.7 | NxW¾W | ExS¾S | 109.7 | WxS¾S |
| NxE⅞E | 21.1 | NxW⅞W | ExS⅞S | 111.1 | WxS⅞S |
| NNE | 22.5 | NNW | ESE | 112.5 | WSW |
| NExN⅙N | 23.9 | NWxN⅙N | SExE⅙E | 113.9 | SWxW⅙W |
| NExN¼N | 25.3 | NWxN¼N | SExE¼E | 115.3 | SWxW¼W |
| NExN⅜N | 26.7 | NWxN⅜N | SExE⅜E | 116.7 | SWxW⅜W |
| NExN½N | 28.1 | NWxN½N | SExE½E | 118.1 | SWxW½W |
| NExN⅝N | 29.5 | NWxN⅝N | SExE⅝E | 119.5 | SWxW⅝W |
| NExN¾N | 30.9 | NWxN¾N | SExE¾E | 120.9 | SWxW¾W |
| NExN⅞N | 32.3 | NWxN⅞N | SExE⅞E | 122.3 | SWxW⅞W |
| NExN | 33.8 | NWxN | SExE | 123.8 | SWxW |
| NE⅙N | 35.2 | NW⅙N | SE⅙E | 125.2 | SW⅙W |
| NE¼N | 36.6 | NW¼N | SE¼E | 126.6 | SW¼W |
| NE⅜N | 38.0 | NW⅜N | SE⅜E | 128.0 | SW⅜W |
| NE½N | 39.4 | NW½N | SE½E | 129.4 | SW½W |
| NE⅝N | 40.8 | NW⅝N | SE⅝E | 130.8 | SW⅝W |
| NE¾N | 42.2 | NW¾N | SE¾E | 132.2 | SW¾W |
| NE⅞N | 43.6 | NW⅞N | SE⅞E | 133.6 | SW⅞W |
| NE | 45.0 | NW | SE | 135.0 | SW |
| NE⅙E | 46.4 | NW⅙W | SE⅙S | 136.4 | SW⅙S |
| NE¼E | 47.8 | NW¼W | SE¼S | 137.8 | SW¼S |
| NE⅜E | 49.2 | NW⅜W | SE⅜S | 139.2 | SW⅜S |
| NE½E | 50.6 | NW½W | SE½S | 140.6 | SW½S |
| NE⅝E | 52.0 | NW⅝W | SE⅝S | 142.0 | SW⅝S |
| NE¾E | 53.4 | NW¾W | SE¾S | 143.4 | SW¾S |
| NE⅞E | 54.8 | NW⅞W | SE⅞S | 144.8 | SW⅞S |
| NExE | 56.3 | NWxW | SExS | 146.3 | SWxS |
| NExE⅙E | 57.7 | NWxW⅙W | SExS⅙S | 147.7 | SWxS⅙S |
| NExE¼E | 59.1 | NWxW¼W | SExS¼S | 149.1 | SWxS¼S |
| NExE⅜E | 60.5 | NWxW⅜W | SExS⅜S | 150.5 | SWxS⅜S |
| NExE½E | 61.9 | NWxW½W | SExS½S | 151.9 | SWxS½S |
| NExE⅝E | 63.3 | NWxW⅝W | SExS⅝S | 153.3 | SWxS⅝S |
| NExE¾E | 64.7 | NWxW¾W | SExS¾S | 154.7 | SWxS¾S |
| NExE⅞E | 66.1 | NWxW⅞W | SExS⅞S | 156.1 | SWxS⅞S |
| ENE | 67.5 | WNW | SSE | 157.5 | SSW |
| ExN⅙N | 68.9 | WxN⅙N | SxE⅙E | 158.9 | SxW⅙W |
| ExN¼N | 70.3 | WxN¼N | SxE¼E | 160.3 | SxW¼W |
| ExN⅜N | 71.7 | WxN⅜N | SxE⅜E | 161.7 | SxW⅜W |
| ExN½N | 73.1 | WxN½N | SxE½E | 163.1 | SxW½W |
| ExN⅝N | 74.5 | WxN⅝N | SxE⅝E | 164.5 | SxW⅝W |
| ExN¾N | 75.9 | WxN¾N | SxE¾E | 165.9 | SxW¾W |
| ExN⅞N | 77.3 | WxN⅞N | SxE⅞E | 167.3 | SxW⅞W |
| ExN | 78.8 | WxN | SxE | 168.8 | SxW |
| E⅙N | 80.2 | W⅙N | S⅙E | 170.2 | S⅙W |
| E¼N | 81.6 | W¼N | S¼E | 171.6 | S¼W |
| E⅜N | 83.0 | W⅜N | S⅜E | 173.0 | S⅜W |
| E½N | 84.4 | W½N | S½E | 174.4 | S½W |
| E⅝N | 85.8 | W⅝N | S⅝E | 175.8 | S⅝W |
| E¾N | 87.2 | W¾N | S¾E | 177.2 | S¾W |
| E⅞N | 88.6 | W⅞N | S⅞E | 178.6 | S⅞W |
| East | 90.0 | West | South | 180.0 | South |

**GREEK ALPHABET.**

| | | | |
|---|---|---|---|
| $\alpha$ | Alpha | $\nu$ | Nu |
| $\beta$ | Beta | $\xi$ | XI |
| $\gamma$ | Gamma | $o$ | Omicron |
| $\delta$ | Delta | $\pi$ | Pi |
| $\epsilon$ | Epsilon | $\rho$ | Rho |
| $\zeta$ | Zeta | $\sigma$ | Sigma |
| $\eta$ | Eta | $\tau$ | Tau |
| $\theta$ | Theta | $\upsilon$ | Upsilon |
| $\iota$ | Iota | $\phi$ | Phi |
| $\kappa$ | Kappa | $\chi$ | Chi |
| $\lambda$ | Lambda | $\psi$ | Psi |
| $\mu$ | Mu | $\omega$ | Omega |

STAR MAP

# FROM THE ELEVATED POLE TO 30° SOUTH DECLINATION

Specially Prepared For

## AZIMUTH OR TRUE BEARING OF CELESTIAL OBJECTS

From

## LATITUDE 41° TO 49° INCLUSIVE

WITH MAPS

BY

Frank Henrich,
Master Mariner

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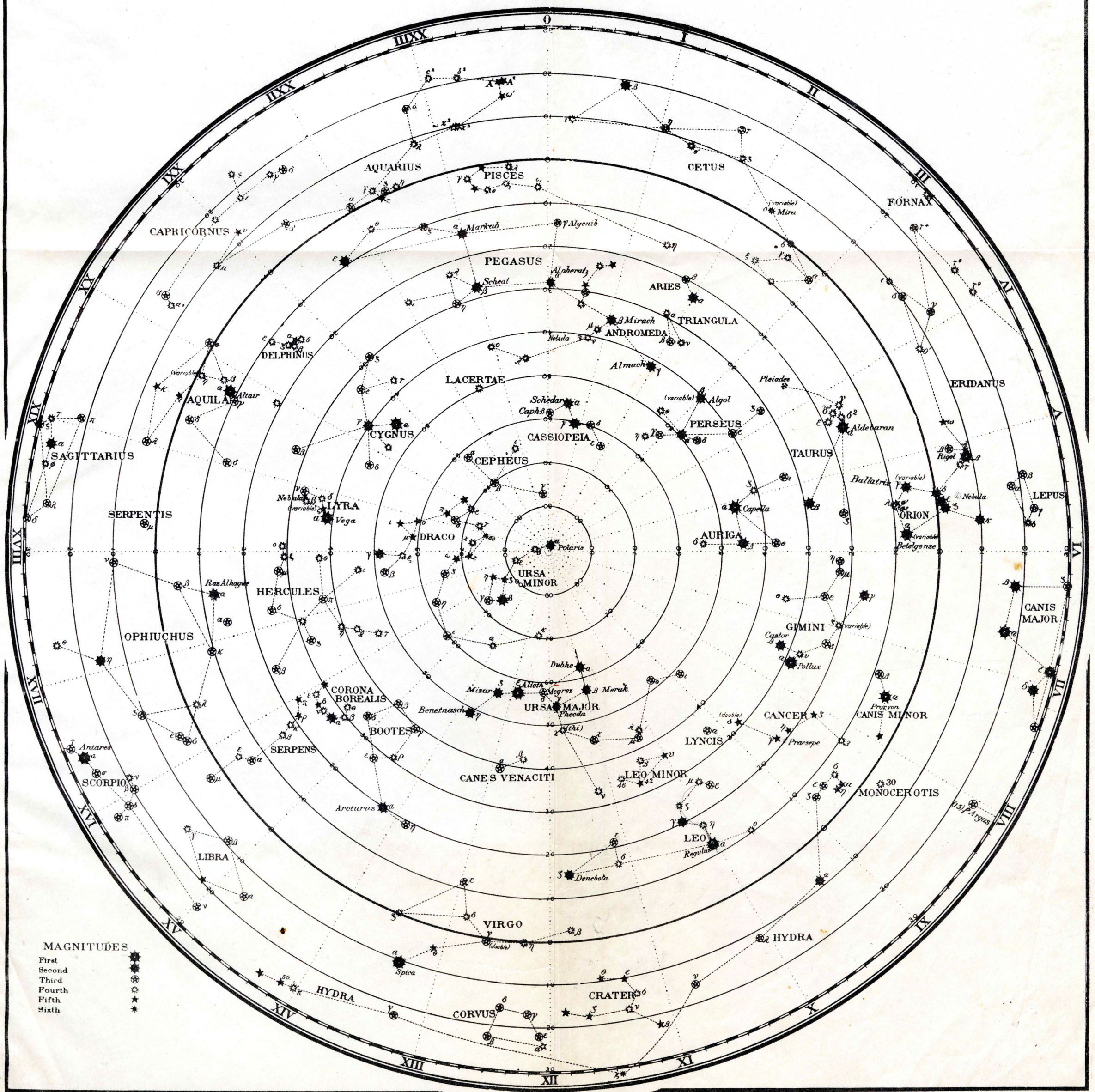


*Drawn by Wallace P. Welbanks, Draftsman U.S. Eng. Dept. at large Duluth, Minn.*